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FROM :

DATE: 29 July 1953

SUBJECT: The Soviet Economy from the End of World War II to Date.

25X1 REFERENCE: Contribution of Office-wide Project O.12

To produce the most accurate economic analysis to the Electrotechnical Industry of the USSR it was necessary to subdivide the industry into segments for which reliable data had been established. The most reliable form of data, as established by basic studies completed or in progress, were selected as a increment part of the whole industrial group and projected to include the generic groups herein called the Electrical Industry and the Electronics Industry or collectively called the Electrotechnical Industry.

Several methods were used as a check on the total figures to establish the reliability of the estimates. It was found that the plant by plant studies and estimates of unit production were more reliable than any other forms of data.

I. State Reserves.

No information available to produce an accurate analysis.

II. Industry and Materials.

A. Chronological history of the Electrotechnical Industry.

1. Dates and changes in Industrial activity.

1945-1947; This was an adjustment period that carried over from the war years the same type of activity and production. This period was marked by rehabilitation of plants and

reconstruction of plants with repatriations, salvage, and land lease equipment.

1947-1949: This was a period of technological development where new devices and copied ideas were reduced to production equipment and products. Many war developed ideas reached the production floors during the period.

1949-1950: This period was marked by shifts in types of products with a particular emphasis on war goods, strategic goods and military end items.

1950-1953: This period has been the first real period of increased production due to technological changes, better workmen, and better equipment.

2. Problems of the industry.

The main Soviet problem was to overcome the time lag between technological developments and production methods in the West and those used in the USSR. The first effort was a grab of Western experts, Western books, and Western equipment. The first efforts lasted until 1949, and were reported by many experts to raise the level of technology considerably (only five years behind the U.S.). The second effort was started shortly after 1945 but did not effectuate any technological gains until 1950 when Russian scientists and engineers began to come into their own with Soviet inspired ideas and designs.

It is now thought by many reliable experts that in the basic Electrotechnical Industry the Russians are virtually

on a par with the U.S., especially in field theory and mathematics. Their future plans to train engineers and skilled technicians are just now exceeding U.S. plans; this may be an indication of future trends.

3. Changes in Norms of production.

There is no accurate analysis of annual increase in production norms for the whole electrotechnical industry. In the industrial segments examined the figure has been quoted by Russian sources as 5 - 6%; this is not believed to be realistic and a figure of 3% is believed to be a normal trend.

4. Estimates of annual volume of production for principal products and for the industry.

Table I

Value of Output of the USSR Electrical Industry

in 1951 US Dollars

Year	Generators 1000 KW	Generators $1000	Transformers KVA 1000	Transformers $1000	Meters 1000 KW	Meters $1000	Total Value $1000
1945	700	10,875	995	8,169	8,159	61,272	80,116
1946	876	13,359	1243	10,205	3,838	91,894	115,458
1947	1314	20,038	1876	15,401	4,863	138,011	173,450
1948	2098	31,994	2975	24,425	7,698	218,469	274,886
1949	2792	42,578	3977	32,651	10,341	293,477	368,706
1950	3362	51,270	4787	39,137	12,423	352,564	442,971
1951	3770	57,498	5359	43,997	13,909	394,737	496,226
1952	4241	64,695	6029	49,498	15,408	412,955	557,128
1953	4971	78,757	6908	55,680	17,519	497,189	685,626

Table I (cont'd)

Year	Total Electrical Industry ($1000)
1945	163,500
1946	235,827
1947	353,977
1948	560,987
1949	752,455
1950	904,015
1951	1,012,698
1952	1,136,986
1953	1,276,777

Table II

Value of the Output of USSR Electronics Industry

in 1951 US Dollars

Year	Value of Tubes in 1950 Rubles	Value of total Electronics Industry
1945	76.4	62
1946	113	93
1947	184	150
1948	271	210
1949	338	280
1950	478	370
1951	569	463
1952	718	600
1953	868	720

Table III

Value of the Output of USSR Turbine Industry in 1951 US Dollars

Year	1000 KW	$1000
1945	[illegible]	8,730
1946	[illegible]	12,180
1947	[illegible]	42,300
1948	[illegible]	34,650
1949	[illegible]	[illegible]

Table III (cont'd)

Year	1000 KW	1000
1950	2600	78,000
1951	3200	96,000
1952	3600	108,000
1953	4050	121,500

Table IV

Value of the Output of USSR Wire and Cable Industry

in 1951 US Dollars

Year	Metric Tons*	$1000
1945	37,969	79,621
1946	41,798	87,375
1947	49,866	104,241
1948	52,010	108,723
1949	54,767	114,486
1950	57,998	117,059
1951	62,000	129,606
1952	70,060	146,455
1953	79,168	165,494

Table V

Value of the Output of USSR Battery Industry in 1951 US Dollars

Year	Primary Batteries Metric Tons	$1000	Storage Batteries Metric Tons	$1000
1945	8,000	6,000	12,000	9,100
1946	9,000	6,800	14,500	11,000
1947	10,000	7,500	17,000	13,000
1948	11,000	8,300	20,500	16,000
1949	11,900	9,000	25,000	19,500
1950	12,500	9,700	29,000	22,800
1951	13,500	10,500	32,800	26,000
1952	15,000	11,300	36,500	28,800
1953	16,000	12,000	39,300	31,000

5. Major Sources.

The major sources for the data produced in this report are the I/RS basic studies and papers both completed and in progress. No new research was undertaken.

6. Difficulties in fulfillment of plan goals since 1945.

It is impossible to make a statement of fact for the plan does not mention the electronics industry nor does it mention segments of the electrical industry.

7. Plan goals.

The plan goals that are mentioned for specific products are realistic and likely to be fulfilled.

8. Limiting factors.

The main factors limiting growth of the Electrotechnical Industry are lack of trained manpower and lack of semi-finished raw materials.

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SOVIET ECONOMIC DEFENSE POLICY SINCE WORLD WAR II

I. Introduction

Defense industry exists in order to supply the arms and equipment for the military forces of the nation concerned. In order to understand the policies governing the activities of defense industry it is therefore necessary to know something concerning the policies of the armed forces. The activities of the producer are necessarily largely dependent on the demands of the consumer. Modern states reconcile the policies of the two by means of a military preparedness program.

II. Military Preparedness Programs

In these perilous times no nation deliberately follows a policy of no armed forces and no defense capacity when it can be avoided. All must have a calculated minimum amount of the means of waging war. This results in the maintenance of some armed forces and defense capacity at all times. Since the maintenance of these forces is expensive and uneconomic, the force in being will never, in peacetime, be equal to the total force which the nation is capable of supporting. Some sort of reserve system is used in order to insure the orderly expansion of the force in being to the limit of the nation's capacity or any portion thereof. Since these expanding forces will need equipment a system to produce military end items rapidly and in large quantity is needed.

Thus is born a military preparedness program.

The purpose of any military preparedness program is to develop a plan by which a nation's armed forces can be expanded in an orderly and rapid manner to the maximum size or that portion thereof necessitated by the occasion. The program must also contain provisions for the outfitting of this force and its maintenance for as long as necessary.

Within this framework there seem to be two principal schools of thought as to the method of implementation of a military preparedness program. These are the United States view and the USSR view. The principal difference between the two is a matter of timing. In order to achieve maximum efficiency the completion of troop training should roughly coincide with fulfillment of equipment orders by industry.

In the United States this objective is reached by initiating both programs at the start of hostilities. With the outbreak of war troops are recruited and then trained during the lead time required by industry to move from its "broad mobilization" to the mass production of equipment. This type of program is prompted by a traditional reliance on the sea as a barrier to any aggressor during the time of mobilization, our traditional abhorence of the use of might as an extension of foreign policy, and our desire for economy.

The Soviet Union employs a program radically different from our own. The Soviet military preparedness program is primarily a peacetime program calculated to place at the disposal of the government a fully trained reserve which can be rapidly mobilized and equipped with material already produced at the outbreak of war. This policy is prompted by traditional Soviet use of force as an instrument of national policy, the presence, presumed or real, of aggressors on the land borders of the USSR, and a Soviet fear that industry might be destroyed by air attack before it could mobilize.

It is not the purpose of this paper to pass on the merits of the two views. They are here stated in order to indicate to the reader, conditioned by U.S. thinking, the different Soviet concept.

III. The Soviet Military Preparedness Program

A. The Policy

A primary duty of every Soviet citizen and every Soviet institution is to insure that the USSR is militarily prepared at all times. There is ample evidence that this has been and will continue to be a cardinal point in overall Soviet economic policy. In delivering the report of the Central Committee of the Communist Party to the XIX Party Congress held in October 1952, G. M. Malenkov stated ..."the task of the Party... tirelessly to strengthen the defense might of the Soviet State." 1/ On the same occasion K. E. Voroshilov stated: "Our Party, Government, and the Soviet people as a whole considered, and will in the future too consider that it is their vital duty to insure the defense - capacity of their socialist homeland, to reinforce in every way the readiness of the Soviet People to meet any agressor fully prepared." 2/ Bulganin stated that: "the assignments envisaged in the draft directives for the Five Year Plan (1951-1955) ensure the continued powerful development of advanced technique, machinery, machine tools, and high precision instruments which, in turn, will require a corresponding growth in a number of highly skilled engineers, technicians, and workers. This will have a great positive significance both for the further strengthening of our economy and for enhancing the defense - capacity of the country since modern war calls for many forms of armament based on the latest achievements in science and technology. 3/

B. The Program

1. The Soviet Military Reserve System

In addition to the Soviet forces in being the USSR has a highly developed reserve system. In the Soviet Union there are twenty-three military districts. 4/ Under the Mobilization Plan each military district is required to supply a specified maximum number of military units whose type and size depends on the population, and economic development of the military district. 5/ This task places a responsibility on the military district for both personnel and material. In the district each of these reserve units exists in fact as well as on paper. Officer assignments to each unit by name are made by Moscow. 6/ The Military District maintains the enlisted ranks at full strength from reservists in the district. 7/ These reserve personnel are employed at various industrial and agricultural enterprises in the district. Assignment to reserve units is made in such a manner that mobilization of the unit will not cripple the enterprise from which the reservists are drawn.

The second major element in the reserve program is that of materiel. Obviously there would be no point in such a well organized and rapid system of personnel mobilization if the new units had to wait for their equipment to be produced. Therefore, the Soviet program calls for the production of equipment each year which is specifically earmarked for the military reserve system. 8/ This equipment is shipped to depots in each military district where it is stored and maintained by regular troops with the assistance of reserve personnel. Since the maximum number, and type of unit to be furnished by each military district is set forth in the Mobilization Plan, storage of the equipment can be carried out in such a way as to permit each unit to draw its equipment from one or more previously designated depots as it mobilizes.

2. The task of Defense Industry in the USSR

The military reserve program as outlined above shapes, in large measure, the program for the operation of defense industry in the Soviet Union. It will be readily seen that the first task of defense industry under the Soviet type system of military preparedness is to produce armaments in sufficient quantity to satisfy the demands of the military reserve system. At the end of World War II the Soviet Union was, in possession of great masses of equipment which had been produced during

the war. This equipment was fed into the military reserve systems as the Soviets demobilized. In this manner the first task of defense industry was accomplished.

Therefore the primary objective of Soviet defense industry since World War II has been to deal with the problem of maintaining the material side of the system in terms of both quantity and quality. The primary task of Soviet Defense Industry in the postwar period has been to compensate for deterioration and obsolescence in the Reserve System.

a) Deterioration

One disadvantage of the Soviet system is that equipment in storage does deteriorate. Deterioration is used here in the practical sense meaning that a piece of equipment has deteriorated to a point that it is no longer mechanically serviceable. Depreciation in the USSR is at a much higher rate than would be the case in the U.S. because Soviet military items are built with a definite eye to combat life. For example, recent examination shows that Soviet aircraft trainers have higher quality workmanship and materials than the MIG-15, a combat aircraft subject to combat attrition rates. 9/ As a result a substantial portion of each year's production of military items is planned for the replacement of items both in the hands of troops, and in storage which have deteriorated because of weather, accident, misuse, or other cause.

b) Obsolescence

A second disadvantage of the system is that of obsolescence. Equipment in being rapidly becomes obsolescent as new weapons are developed. However this cannot be termed a critical disadvantage without some serious thought. In the first place the Soviets have no moral qualms or political problems in sending their soldiers to fight with obsolete equipment. Second, obsolescence of the park of equipment is to some extent mitigated by the comparatively short life of the equipment. Most important of all is the fact that while Soviet items may be obsolete compared to their enemy's newest weapons, the Soviets have it in mass at the outbreak of war whereas it will take a nation without a large equipment park perhaps a year to mass produce the weapon. During that year the Soviets will have an advantage in sheer numbers which may be overwhelming. The second task of Soviet defense industry is, therefore, to mass produce newly developed weapons for the military reserve system.

IV. Defense-Industry 1944-1953

Portions of Soviet defense industry began to convert to civilian production as early as 1944 although large scale reconversion was carried out during the latter part of 1945 and throughout 1946. During the immediate postwar period (1946-1947) a large scale reorganization of the defense industries was carried out as a part of the general economic readjustment following the war. The object of this reorganization was to put into wide practice techniques of manufacturing and management learned during the war, and to erase certain economic inequities caused by wartime exigencies, such as uneconomic component supply networks etc. By 1948 the defense industries had begun to operate on a normal peacetime basis which while "normal" for the Soviets was considerably in excess of levels in other countries.

Every activity in the Soviet Union is closely connected with a plan, The Plan. Defense Industry is no exception. The Armed Forces, as the consumer in this relationship draws up a program which it would like to see implemented. The program is considered by Gosplan and the desires of the military are reconciled with overall aims, and the ability of

of defense industry to fulfill the plan. When agreement is reached the Plan comes forth in secret sections of the Five Year Plan. Once the Plan is finalized the defense industries will be allotted sufficient means to carry out their appointed tasks. As has been pointed out, defense-capacity, and the defense of the USSR in general carry a high priority. Consequently there is little reason to doubt that the defense industries' goals and objectives under the Fifth (or any) Five Year Plan will not be fulfilled. In general oversupply will occur long before limiting factors are reached in the peacetime production of conventional weapons in the USSR. Where danger of underfulfillment does arise, civilian production will be sacrificed in order that defense can be met.

On the basis of speculation, pure and simple, it is believed that the following are some of the defense industry objectives contained in the secret sections of the Fifth Five Year Plan:

1. To replace existing medium tank holdings with the T-54 medium tank.

2. To replace existing light 37 mm anti-aircraft gun stocks with the new 57 mm radar controlled anti-aircraft gun.

3. To replace existing heavy 85 mm anti-aircraft gun holdings with the new 100 mm radar controlled anti-aircraft gun.

4. To produce sufficient 82 mm recoiless rifles for the military reserve system.

5. To produce sufficient GAZ-69 command and staff vehicles for the military reserve system.

6. To produce for the military reserve systems sufficient ammunition for the new weapons mentioned above.

In conclusion, it is believed that the peacetime annual tasks of defense industry are two-fold.

1) To produce sufficient standard items of equipment to replace those which have deteriorated during the previous year.

2) To produce sufficient numbers of newly developed weapons to equip the forces in being and the military reserve system.

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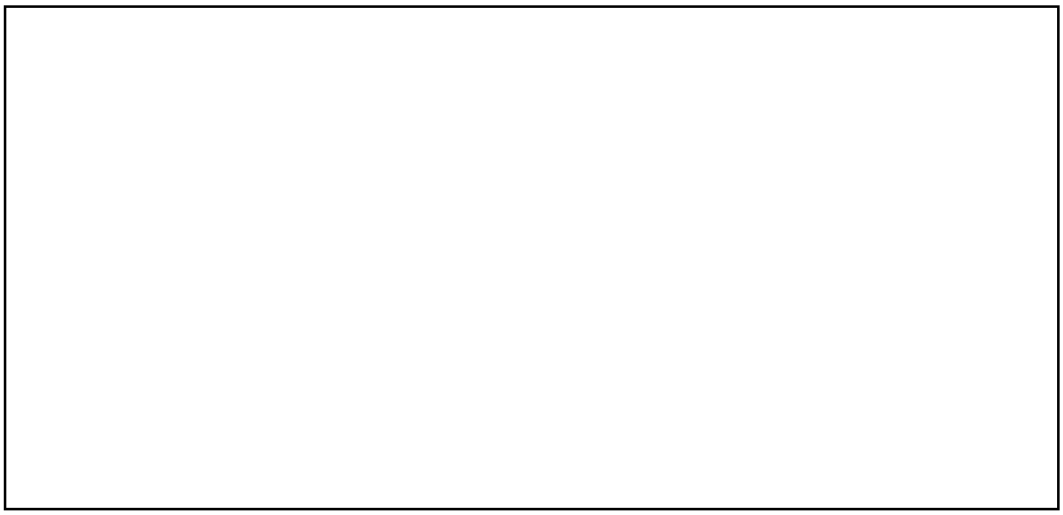

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III. State Reserves - No information on reserves of chemicals.

V. Industry and Materials.

A. Chronological History of the Activities in the Soviet Chemical Since World War II.

1. Changes in Industrial Activities.

Following World War II, very little reconversion was necessary in the Soviet chemical industry. The very nature of this industry is such that its products, for the most part, are basically the same in peacetime as in wartime. In peacetime, chemicals are used primarily in the manufacture of products for civilian consumption whereas in wartime, the same chemicals are diverted to the production of military end items. The only reconversion that was necessary in the Soviet chemical industry after World War II, therefore, was in those branches of the industry manufacturing military end items. For example, after the cessation of hostilities, production of military explosives and chemical warfare agents was curtailed and the resulting increased availability of chemicals such as benzol, toluol, phenol, nitric acid, sulfuric acid, phosphorus and chlorine was utilized for increasing the output of fertilizers, dyes, synthetic rubber, plastics, insecticides and other products useful to both civilian and military sectors of the economy. Another example of reconversion is in the plastics fabricating industry which, after World War II, diverted part of its production from [redacted] such as

aircraft parts and accessories to the production of civilian end items such as radio housings, telephones and personal accessories. No information is available as to the precise dates or the extent of these reconversions to production of items for civilian consumption but it is believed that the production of military end-items, particularly explosives, remained at a very high level in the USSR until about 1948, probably for the purpose of establishing substantial stockpiles. The initiation of hostilities by communist forces in Korea in June 1950 undoubtedly [illegible] the conversion of some civilian chemical production in the USSR to military production but, again, specific information regarding the nature, the date

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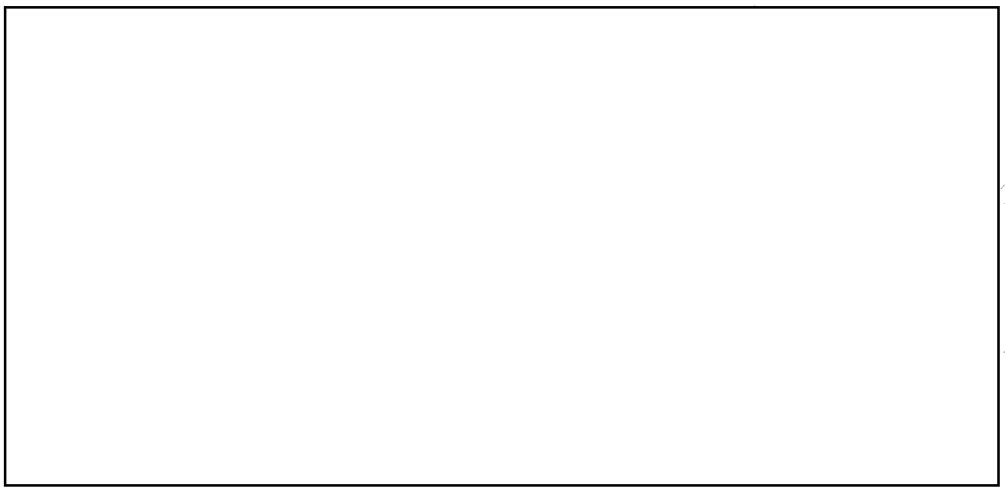


a. Problems of Production.

The principal production problem as [illegible] increase the output of basic chemicals such as ammonia, nitric acid, sulfuric acid, soda ash, caustic soda and the coal tar chemicals. Limited supplies of these chemicals were not only retarding the output of mineral fertilisers, agricultural crops and consumers' goods but were restricting the growth of the war potential which was causing the Soviets great concern. Increasing the output of these chemicals de-

pended primarily on the completion of the reconstruction of the war-damaged facilities and on the expansion of existing production facilities. The Soviets have achieved some success in increasing the output of these chemicals, particularly ammonia, nitric acid, and the coal tar chemicals, which are of prime importance in wartime, but the production of the less essential products such as sulfuric acid, soda ash, and caustic soda still remains low.

The Soviet technical periodicals have stated that there is insufficient production, with respect to both quantity of output and range of assortments, of synthetic organic chemicals for the dye, plastics, insecticide, rubber and other industries.

[redacted] confronting the Soviet chemical industry which have been mentioned in the Soviet technical periodicals are: (i) Inefficient utilization of [redacted] soda and sulfuric acid to produce caustic soda; (ii) Low quality, not only of chemicals and products for civilian consumption such as plastic articles and rubber products but also of basic chemicals such as calcium carbide and caustic soda; (iii) Consumption of excessive amounts of raw materials and electricity; (iv) Incomplete recovery and utilization of by-products and industrial wastes; (v) Insufficient effort directed toward the lowering of production costs and toward the development of new and more efficient methods of production; (vi) Insufficient mechanization of materials handling and other labor-consuming operations; (vii) Insufficient development of processes for automatic control and [redacted] work of the

[redacted]

planners, the principal [redacted] of which the process of converting [redacted] is much too time-consuming.

b. Problems of Supply.

Responsible to a great extent for the problems of production previously mentioned are the following problems of supply: (i) An insufficient supply of electric power. There have been press references to a shortage of electric power retarding the output of calcium carbide and it is probable that this shortage also has hampered production of other chemicals which are large consumers of electricity, such as chlorine and caustic soda, synthetic ammonia and elemental phosphorus. (ii) An insufficient supply of process control instruments and specialized types of processing equipment and machinery such as stamping and pressing devices for the plastics industry and new types of electrolytic cells for the chlorine industry; and (iii) An insufficient supply of specialized types of containers and transportation equipment, such as RR tank cars and river tankers for the transportation of corrosive chemicals and liquified gases.

3. Changes in Norms of Production - No information.

4. Production Estimates.

Estimated USSR Production of Certain Chemicals a/
1945-1955

Thousand Metric Tons

Commodity	1945	1946	1947	1948	1949	1950 (Actual)	1950 Plan	1951	1952	1953	1954	1955	1955 Plan (Est.)	1955 Planned % Increase over 1950
Sulphuric acid	N.A.	1,150	1,370	1,590	1,810	2,040	N.A.	2,280	2,500	2,750	3,030	3,330	N.A.	N.A.
Nitric acid	500	605	710	820	930	1,040	N.A.	1,065	1,172	1,195	1,211	1,211	N.A.	N.A.
Ammonia (N)	300	323	368	440	489	544	N.A.	550	590	638	686	733	N.A.	N.A.
Soda ash	95	105	115	135	170	205	N.A.	235	261	291	320	350	N.A.	N.A.
Caustic soda	112	122	152	190	241	277	390	300	333	387	441	496	496	N.A.
Chlorine	225	245	297	427	560	655	800	715	865	945	1,080	1,100	1,300	N.A.
Synthetic resins	N.A.	130	130	191	239	254	266	282	304	326	348	370	N.A.	N.A.
Synthetic rubber	N.A.	N.A.	92	N.A.	131	171	N.A.	200	230	252	306	360	N.A.	N.A.
Plastics	N.A.	N.A.	22	N.A.	32	42	N.A.	49	56	63	74	88	N.A.	N.A.
Phosphate fertilizer	N.A.	N.A.	8	N.A.	11	15	N.A.	17	20	22	27	32	N.A.	N.A.
Potash fertilizer	N.A.	N.A.	20	N.A.	29	38	N.A.	44	51	56	68	80	N.A.	N.A.
Nitrogen fertilizer (N content)	N.A.	N.A.	4.3	N.A.	6	8	N.A.	9.3	11	12	14.4	16.8	N.A.	N.A.
Explosives and propellants b/	770	1,170	1,580	2,260	2,960	3,520	5,100	3,760	4,060	N.A.	N.A.	N.A.	6,600	88%
Calcium carbide	N.A.	N.A.	N.A.	N.A.	200	233	N.A.	267	300	336	373	410	N.A.	N.A.

a. The sources of production estimates are listed in Appendix A.
b. Millions of gallons.
c. Preliminary estimates.

[redacted]

The major sources of production increase in the Soviet chemical industry since 1945 have been as follows:

a. New Production Capacity.

Since the end of World War II, tremendous amounts of new chemical production capacity have been put into operation in the USSR. This was made possible by extensive dismantling of German chemical plants and reinstallation of the equipment in Soviet plants, particularly in those plants which were damaged during the war; by the use of a vast PW labor force which considerably accelerated the reconstruction and expansion of Soviet industry and by the exploitation of German technology through its assignment to Soviet technical personnel.

b. Increase in the Labor Force.

Following World War II, large numbers of young men were released from the Soviet military service which increased the size and improved the quality of the labor force in the chemical industry.

c. Improved Operations.

Since the war it has been apparent from the statements in the press and technical periodicals that the Soviets have devoted considerable effort toward increasing production and improving the efficiency of operations in the chemical industry. It cannot be doubted that these efforts have resulted in at least some production increases which, although possibly quite substantial, would not approach the magnitude of the [redacted] capacity.

[redacted]

[redacted]

7. [redacted]

The Fourth Five Year Plan, as published for the information of peoples outside the USSR, set the following goal for the production of chemicals in 1950: Caustic soda - 390,000 tons; calcined soda - 800,000 tons; mineral fertilizers - 5,100,000 tons; synthetic dyes - 43,000 tons; alcohol - 266,000,000 gallons.

The actual achievements in the production of these chemicals in 1950 are estimated to have been as follows: Caustic soda - 277,000 tons which was 113,000 tons below the planned goal; calcined soda - 655,000 tons which was 145,000 tons below the planned goal; alcohol - 254,000,000 gallons which was 12,000,000 gallons below the planned goal. A preliminary estimate of mineral fertilizers production in 1950 indicates an output of about 3,500,000 tons which was 1,600,000 tons below the planned goal. No estimate is available concerning Soviet achievements in the production of synthetic dyes. It is apparent from these data that the Soviets failed to achieve the major goals set for production of chemicals in 1950. The primary reason for the failure to fulfill the plans for caustic and calcined soda probably was the failure to get the new plant at Sterlitamak into operation as early as was originally planned.

The immediate reason for the apparent failure to fulfill the plan for production of mineral fertilizers [redacted] for superphosphate [redacted]

[redacted] the result of failure to provide sufficient [redacted]. It is probable that the Soviets did not [redacted] appreciation of [redacted] acid production facilities and accepted the consequent [redacted] of mineral fertilizers production in order to concentrate their efforts on increasing the output of more essential products.

8. The Draft Directives of the Soviet Fifth Five Year Plan (1951-1955).

The Draft Directives of the Soviet Fifth Five Year Plan, as announced by Tass on August 20, 1952, provided for increasing the output of the following chemicals in 1955 as compared with 1950 by the percentages stated: Calcined soda - 80 percent; caustic soda - [illegible] percent; and mineral fertilizers - 88 percent. It is believed that the [illegible] for soda ash and caustic soda are realistic and [illegible] attainable. The [illegible] of mineral fertilizers, however, appears [illegible] unless [illegible] chemical industry is considerably accelerated during 1953, 1954, and 1955.

9. Limiting Factors Which Will Tend to Slow Future Industrial Growth.

The principal limiting factors which will tend to slow the future expansion of the Soviet chemical industry are believed to be as follows:

a. Easy acquisition of equipment for expansion will not be possible and Soviet factories will have to supply practically all new chemical process equipment. The dismantling of equipment from the occupied countries has been discontinued, the acquisition of equipment through reparations will not be significant, and western export controls will greatly limit [redacted] equip-

[redacted]

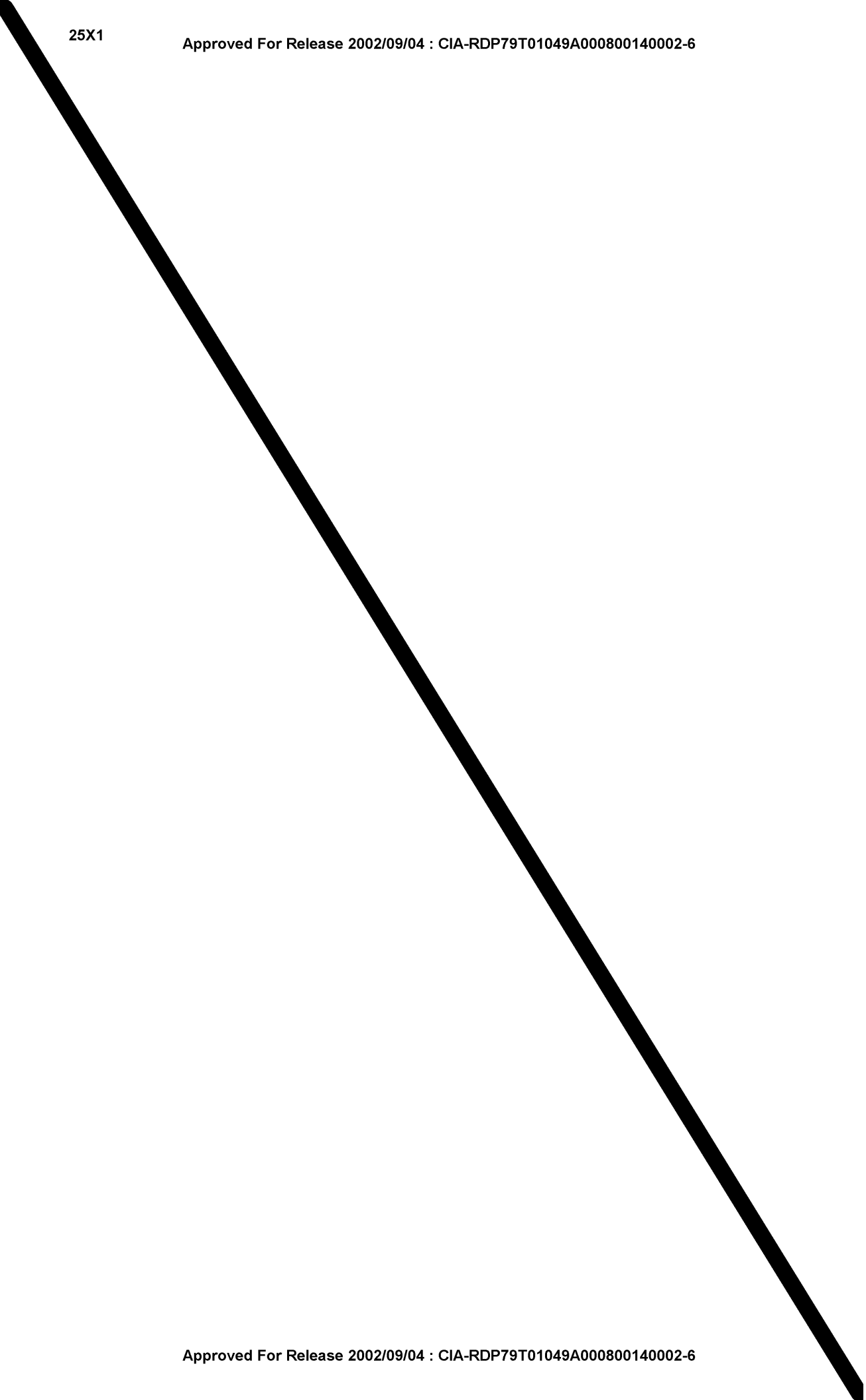
ment that can be purchased [redacted]

[redacted] Production increases that can be effected by more efficient utilization of capacity are not significant. It is believed that most Soviet chemical factories are now operating within reasonable limits of practical capacity.

c. The relatively underdeveloped Soviet synthetic organic chemical industry will have a retarding effect on the expansion of the entire chemical industry. Extensive facilities are not available for the manufacture of a large quantity or a wide variety of such consumers' products as detergents, plastics, pharmaceuticals, insecticides and [illegible] products which are large consumers of chemicals. Therefore, until the [illegible] facilities for such products are created, the growth of the Soviet [illegible] industry will be limited by the demand for its

[redacted] the number of [illegible] personnel trained in the design, construction and operation of new types of plants will retard the development of the synthetic organic chemical industry which, as previously stated, will have a retarding effect on the expansion of the entire chemical industry.

[redacted]



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22 July 1953

Office-Wide Project C.12

Trends in Soviet Economic Policy Since 1945

Rubber

III. State Reserves.

There is no available information on state reserves program in rubber.

However, a stock of around 205,600 tons of rubber was estimated to be accumulated by the end of 1951, and imports in 1952 indicate a further addition yearly to stockpile. This stock most probably is rotated as new imports come in, but no estimate of dates accomplished or rate of rotation is available.

V. Industry and Materials.

A. Chronological History of the Activities in the Soviet Rubber Since World War II.

1. Changes in Industrial Activities.

Rehabilitation of damaged and old plants took place after the war, and probably up to 1948. Although this effort, together with new building, is continuing, the major effort was believed to have been made during these years.

Efforts to build up a stockpile was apparent in 1948 and 1949 with a lessening of such build-up by the USSR after that date.

Increased use of synthetic rubber probably was stressed by 1948 and in 1950 several announcements of some completely synthetic rubber tires were noted in information. Increased use of reclaimed rubber, also, was noted around this period and is continuing.

Greater emphasis on production of heavy tires has been apparent in post-war years.

2. Major Problems Encountered in the Industry Since January 1946.

One of the major problems in the rubber industry of the USSR is believed to have been lack of rubber chemicals and of certain grades of carbon black. The use of increased quantities of synthetic rubber also required variations in compound formulas, as well as the development of new types of synthetic rubber. Insufficient equipment has presented some difficulties in plant expansion programs.

3. Changes in Norms of Production.

There has been much reported on improvement in labor productivity but no definite changes in "norms" by the industry have been apparent.

4. Production Estimates.

Estimated USSR Production of Major Rubber Products 1946-1953

	Synthetic (MT)	Reclaimed (MT)	Motor Vehicles Tires (000)
1946	40,000	21,000	2,975
1947	50,000	23,000	3,871
1948	90,000	30,000	5,205
1949	122,000	37,000	6,694
1950	143,000	45,000	8,239
1951	172,000	50,000	9,185
1952	187,000	55,000	10,051
1953	206,000	61,000	10,997

The Five Year plan goals (1946-1950) provided that in 1950 motor tire production would reach a three-fold increase over prewar production (believed

to be a goal of about 12,000,000 tires by 1950), and double the prewar rate of synthetic rubber (1940 production estimated at 74,500 x 2 = 149,000 tons, the estimated goal for 1950). Reclaimed rubber production was to reach 56,000 tons in 1950. None of these goals were believed to have been fully realized, although synthetic rubber production in 1950 was close to planned goal.

5. Major Sources of Annual Production Increases.

Major cause of increase in rubber industry has been increased capacity made possible by the rehabilitation and expansion of prewar facilities as well as the building of new plants.

6. Annual Increases in Productivity and Labor Force.

No information.

7. Specific Difficulties Encountered in Fulfillment of Plan Goals Since 1945.

Lack of equipment and facilities, as well as to some degree lack of skilled labor in specialized fields, have been problems contributing to the failure to reach planned goals.

8. The Draft Directives of the Soviet Fifth Five Year Plan (1951-1955).

For 1955, the goal for synthetic rubber is only goal known in rubber industry. This goal, an 82% increase, could be achieved if new facilities are added and improvements made. For instance, with addition of cold and/or oil-extended synthetic rubber, production from present facilities could increase by one-third without major additions of equipment or labor. New facilities under construc-

tion and additions of units to other plants would also add substantially. Increases are not so exaggerated that they would be impossible to reach.

9. Limiting Factors Which Will Tend to Slow Future Industrial Growth.

Industrial growth in synthetic rubber and motor vehicle tire production has already slowed down, as shown in following postwar yearly rates of increases.

	Synthetic rubber	Tires
1947	-	49
1948	79	38
1949	36	39
1950	18	30
1951	20	N.A.
1952	9	N.A.

Note: All references taken from CIA/ORR 19, 19 January 53, Secret.

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Trends in Soviet Economic Policies

Project 0.12, Item V — Solid fuels — M/S Contribution

A. Chronological History

1. Changes in Production Schedules

The Fourth Five Year Plan (1946-50) called for coal production to reach 250,030,000 tons in 1950. There were no announcements of planned annual increases for the entire coal industry, although a few annual increases in percentages and super plan pledges in absolute figures were reported for a particular combine or trust. There were no very significant changes in the original target figures for 1950 as laid down at the time they were established about 1946, except that as annual goals were exceeded, a higher quota was expected to be met in the following year.

2. Major Problems in the Industry Since 1948

a. The problem of producing sufficient quantities of coals with necessary qualities for coking purposes is becoming more serious as demand for coking coal increases. All coal used at coke plants represents blends of coals with varying characteristics, including much coal that will not coke without admixture with other coals having strong coking properties. It has been necessary to use higher proportions of the less desireable gas coals in blending.

b. A lag in the construction of preparation facilities and briquette plants since the inception of the Fourth Five Year Plan (1946-50) has contributed to poor quality. A sharp increase in mechanical loading has contributed to higher ash content in the run-of-mine coal and rendered the need for cleaning more imperative.

c. The replacement of thousands of war prisoners in the coal mines was a problem several years ago, but was solved, apparently, without affecting overall output quotas. In some mining areas, there is heavy dependence on forced laborers, women and youths. While labor productivity has been increasing steadily since the end of World War II, it was still below the prewar level in the highly important Donbas and Karaganda mines in 1951.

d. New mine construction was lagging during the Fourth Five Year Plan and it is believed that the number of new mines that were opened and their capacity were considerably less than intended. Some large strip mines in the Ukraine were not completed on time, mainly for lack of equipment.

3. Changes in Norms of Production

In 1945, labor productivity was low in the coal industry, but has climbed steadily since then. It was not until 1951, however, that average labor productivity exceeded the level that had been reached in 1940, although it was still less in the important Donbas and Karaganda mines, which together account for a little more than 40 per cent of the total coal production.

The Soviets have reported some information concerning planned increases in labor productivity and accomplishments. The plans are reported in the form of pledges by the workers in a particular combine or trust calling for an annual increase that generally varies from 5 per cent to more than 10 per cent. Sometimes a pledge is made to produce a certain quantity of coal over the plan.

The rise in labor productivity that has occurred since the war can be traced to changes in mining methods, use of new and improved types of machinery, substitution of machinery for hand labor, better working conditions and more labor efficiency.

New machines called combines, which are designed to cut and load coal simultaneously without blasting, have been introduced in the postwar period and the number has been growing rapidly during the past few years. They have revolutionized the process of coal extraction in underground mines and have contributed much to higher labor productivity. In many cases, two or three times as much coal is cut with one of these machines as with the old type cutting machines. Norms for these machines are being raised steadily as workers become more skilled in their use and new production records are attained.

Norms are established for workers and machines and they vary, depending upon local conditions, such as the thickness and pitch of the coal seam, hardness of the coal, nature of the roof and bottom and the methods of mining. It is not possible to furnish at this time any data about changing norms which would be of much value.

4. Coal Production a/

Thousand Metric Tons

Year	Anthracite and Bituminous b/	Lignite and Brown Coal	Total	Percent Increase
1945	103,700	45,600	149,300	16.6
1946	115,600	48,600	164,200	10.0
1947	131,200	52,700	183,900	12.0
1948	150,450	59,200	209,650	14.0
1949	171,000	65,100	236,100	12.6
1950	190,800	71,200	262,000 c/	11.0
1951	205,000	77,400	282,400	7.8
1952	215,800	85,500	301,300	6.7

a. The estimates may be in excess of actual by as much as the following: 1950-1.4 million tons; 1951-1.5 million tons; 1952-2.5 million tons.

b. Anthracite and bituminous coal are frequently referred to as hard coal in Europe.

c. Plan figure was 250,000,000 tons and is estimated to have been exceeded by 4.8 per cent.

5. Sources of Coal Production

Estimated Coal Production by Basins and Fields
1950
Thousand Metric Tons

	Anthracite	Bituminous	Lignite & Brown Coal	Total
Western Regions				
Donets Basin	34,000	61,000		95,000
Moscow Basin			29,600	29,600
Georgian SSR		1,600	175	1,775
Pechora Basin		10,850		10,850
Spitzbergen		185		185
Western Ukraine			2,400	2,400
Caucusus (excluding Georgian SSR)		250		250
Crimea SSR		40		40
Leningrad Area			750	750
Volga Area			50	50
	34,000	73,925	32,975	140,900
Eastern Regions-Urals Area				
Kizel Basin		12,000		12,000
Chusovaya		200		200
Volchanka			6,500	6,500
Bogoslovsk			2,000	2,000
Chelyabinsk Basin			11,500	11,500
Yegorshino	600			600
Poltavka-Bredy	350			350
Dombarovka	150			150
Sverdlovsk, Artemovsky & Bulanash		750		750
Bashkir ASSR		50	200	250
Chkalov Oblast			150	150
Udmurt ASSR			50	50
	1,100	13,000	20,400	34,500
Karaganda		13,500	2,500	16,000
Kazakh SSR (excluding Karaganda)		1,000	500	1,500
Central Asia		475	3,800	4,275
Kuznetsk Basin	2,625	34,000		36,625
Eastern Siberia				
Taimyr National Okrug				
Norilsk		400		400
Khatanga		20		20
Khakass A.O.				
Minusinsk Basin		2,150		2,150
Tuva A.O.		5		5
Krasnoyarsk Krai				
Kansk Basin		1,000		1,000
Irkutsk Oblast				
Cheremkhovo		7,000		7,000
Other		150		150
Buryat-Mongol ASSR		250	250	500
Chita Oblast				
Bukachacha		1,100		1,100
Chernovski Kopi			1,200	1,200
Other			450	450
Yakut ASSR				
Kangalasskiye Kopi			100	100
Sangar			100	100
Zyryanka		75		75
Eastern Siberia - Total		11,150	3,100	14,250

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Thousand Metric Tons

	Anthracite	Bituminous	Lignite & Brown Coal	Total
Far East				
Kharbarovsk Krai				
Bureya Basin		400		400
Other			150	150
Amur Oblast				
Kivda			300	300
Raychikhinsk			4,000	4,000
Primorsky Krai				
Suchan	75	1,325		1,400
Artem			2,500	2,500
Podgorodnenka		175		175
Tavrichanka			200	200
Voroshilov		175		175
Lipovetsk			225	225
Ugolnaya - Uglovaya			200	200
Kraskino			25	25
Other			125	125
Sakhalin Island				
North Sakhalin		500		500
South Sakhalin		2,500		2,500
Kamchatka				
Tilichiki		75		75
Ugolnaya		50		50
Far East - Total	75	5,200	7,725	13,000
Other Eastern Areas		750	200	950
Eastern Regions - Total	3,800	79,075	38,225	121,100
Total USSR	37,800	153,000	71,200	262,000

6. Annual Increases in Productivity and Labor Force

Year	Coal Production: Thousand Tons	Coal Production: Increase Percent	Annual Production Per Worker: Tons	Annual Production Per Worker: Increase Percent	Estimated Number of Workers
1940	166,000	13.9	312		532,050
1945	149,300	16.6	210 a/	2.8	710,950
1946	164,200	10.0	215 a/	N.A.	763,700
1947	183,900	12.0	221	N.A.	832,100
1948	209,650	14.0	250	13.0	838,600
1949	236,100	12.6	272	8.7	868,000
1950	262,000	11.0	300	10.2	873,350
1951	282,400	7.8	323	7.6	874,300
1952	301,300	6.7	342	6.0 b/	881,000

a. It is known that output was very low, but there are no Soviet data.
b. Assumed increase, although actual may have ranged from 5 to 8 per cent.

7. Specific Difficulties Encountered in Fulfillment of Plans Since 1945

The major difficulty which the Soviets had to contend with in the coal industry during the Fourth Five Year Plan was restoration of production at the Donets mines. These mines were wrecked during World War II and the tasks of rebuilding shafts and

surface structures, draining vast quantities of water, opening and retimbering entries and working places, and providing the necessary equipment was each in itself a formidable one. Coal output in the Donbas had to be increased from 36.5 million tons in 1945 to more than 90 million tons in 1950. The job of reconstruction and the production plan were accomplished because of all-out-effort, round-the-clock operations and high priority in allocations of labor, materials, and equipment.

Practically all of the coal mining equipment plants in the Ukraine were damaged or destroyed during World War II. These plants supplied nearly all of the equipment for the Soviet coal industry before the war, although some new plants were built later in the east. The lack of adequate facilities to build new machinery at a time when there was an unprecedented demand for it, was a great handicap. Difficulties also arose from attempts to build new models and types of machines, many of which proved to be poorly designed and mechanically defective. The majority of models of new combines were found to be unsatisfactory in tests and were never put into serial production. The Makarov combines, which were among the first models, may be considered as failures from evidence that both management and labor have opposed their use in the Karaganda mines. There was much criticism of the fact that many of these machines were idle. The Donbas combine, however, is proving to be generally successful.

According to the 1950 Plan, the Western Ukraine was to have furnished 6 million tons of low grade brown coal, but it is believed that actual output was far short of that figure. The failure is attributed to slow construction of new strip (surface) mines, because necessary equipment was not available.

Large strip mines in the Urals and at Raychikhinsk in Amur Oblast had difficulty with steam traction equipment during bad weather which contributed to considerable idleness of power shovels. Some of the mines in the Urals have changed over to electrified traction in the last year or so, which is understood to have improved conditions. Another difficulty at strip mines has been the use of power shovels with too small capacity for the overburden that had to be handled, necessitating the transport in railroad cars of large quantities of rock which could have been dumped into worked-out areas if large excavators had been employed. Since 1950 a few large power shovels and draglines with capacities ranging from 10 to 14 cubic meters have been built, but a great many more are needed.

8. The Fifth Five Year Plan (1951-55)

There is relatively little information about the current Five Year Plan as compared with the previous one. The principal objectives include the following: (a) to increase coal production 43 per cent as compared with 1950; (b) to increase the production of coking coal by not less than 50 per cent and the production capacity of coking coal mines by 80 per cent; (c) to improve the quality of coal by increasing its concentration (cleaning) approximately 2.7 times in 5 years and by expanding substantially its briquetting; (d) to construct 30 per cent more mine capacity than called for in the Fourth Five Year Plan; (e) to systematically improve mining methods by introducing machines on a wider scale, particularly in mechanization of cutting, loading and haulage; (f) to aim at further technical reequipment of the coal industry and at a growth of labor productivity.

The 1955 goal for total coal production is indicated to be about 375 million tons or possibly as much as 3 million tons less than that figure. The increase amounts to about 113 million tons in 5 years or an average of 22.6 million tons annually. The increases in 1951 and 1952 over the preceding year are estimated at 20.4 million tons and 18.9 million tons, respectively, so that it will be necessary to show an annual increase of nearly 25 million tons in the last 3 years if the 1955 Plan is to be fulfilled. During the last 3 years of the Fourth Five Year Plan (1946-50), the annual increase averaged 26 million tons, but the possibilities of duplicating such expansion appear less favorable in the current plan period. The reason is based on the fact that the Donets mines accounted for about 48 per cent of the increase in the years 1948-50, during which time the old mines with already developed capacity were rapidly being restored to prewar production. Now the situation is changed and expansion at the Donets mines will depend mainly on new development and increased labor productivity, thus restricting growth to a slower rate than was the case in the former period of comparison. If the 1955 objective is realized, it is more likely to be the result of large production of low quality coal at strip mines and the possibility of a substantial increase in the labor force. It is believed that 1955 production will be closer to 365 million tons than 375 million tons.

It is not possible to furnish a production figure for coking coal because there is considerable coal mined that the Soviets classify as suitable coking coal, consisting mostly of gas coals and low volatile varieties, but which is used also for other purposes than the manufacture of coke. It is a safe assumption, however, that the increase of 50 per cent or more is intended to come almost entirely from the

Donets, Karaganda, and Kuznets basins with some from the Pechora and Bureya basins. The Soviets have recently admitted that considerable coal was being mined which could be coked if it were cleaned. The possibility of expanding the supply of coking coal as much as planned may depend to a large degree on the success in constructing adequate cleaning facilities.

The construction of cleaning plants lagged badly during the last Five Year Plan, but it is believed that the Soviets are now in much better position to provide such plants and to improve the quality of the various coals. Evidence that there is much to be done in this field is to be found in a statement that the ash content of railroad coal averaged nearly 24 per cent in 1950 and around 17 per cent for coal used at power stations.

It appears that the capacity of new mines to be constructed during the current Five Year Plan is about 150 million tons and the number of mines would be between 350 and 400. There isn't enough information available to judge very well the progress already made or prospects of realizing such objectives. It is believed, however, that they will not be met.

9. Limiting Factors on Industrial Growth

European Russia is largely dependent on the Donets Basin for good quality coal. The only other sources of bituminous coal in the European part of the country are the Pechora Basin, which is located north of the Arctic Circle and near the Kara Sea, and the small deposits in the Caucuses. The latter do not furnish enough coal to supply regional requirements and the Donbas has to make up the deficit. The Pechora Basin is in a remote area that has a severe climate and where mining is

mainly dependent on forced labor. The bulk of the coal from the Pechora Basin has to be moved between 1,000 and 2,000 kilometers by rail to consumers. Furthermore, Donets coals, necessarily, must be hauled long distances to the central industrial region (Economic Region VII) and the Volga region (Economic Region VI). These long hauls from Pechora and the Donbas place a heavy burden on the railroads, although completion of the Volga-Don Canal must result in much greater water shipments of coal to the Volga region during the months when navigation is open and help to reduce the cost of transportation from the Donbas.

The Donets and Pechora basins and two deposits in Georgian SSR - Tkvarcheli and Tkvibuli - are the only areas where coking coal is produced. In the past, the Donbas has furnished practically all of the coking coals in the western regions. The quality of the Georgian coals for coking purposes is apparently not very good and the mines do not show much promise for expansion of output. If a railroad is built from the Pechora mines to the Urals, it would help to improve the coke situation a great deal in the Urals.

Indications are that requirements for Donbas coking coals will increase substantially. It may be expected that the Soviets will experience serious difficulties in providing sufficient quantities of those coals with better coking properties from the Donbas. Furthermore, the trend to use higher proportions of gas coals in the blending is likely to continue and may result in coke with weaker structure. An increase in the supplies suitable for coking will depend to a large extent on the ability to clean certain coals with high amounts of impurities.

A fundamental industrial weakness of the Urals is a lack of coking coals and the necessity of transporting such coals from Karaganda and the Kuzbas, distances of 1,200 to 2,000 kilometers. The shipments will rise about proportionately with expansion of the iron and steel industry in the Urals and will add to the already heavy burden of traffic on the rail lines.

The USSR has ample coal reserves, although more than 90 per cent of them are located in the eastern regions. There is no reason to believe that overall coal production cannot continue to expand, but the quality may decline somewhat with development of low grade deposits to satisfy local needs as, for example, in the Western Ukraine, Bashkiria, Central Asia and some other areas. The Moscow Basin was developed for that reason, although the coal is worse than any used in the United States. The Moscow Basin now contributes over 11 per cent of the entire Soviet coal output. The plans that are underway to use local fuels, despite poor quality, can result in some reduction in the long haul factor, but long distance transport of a huge volume of coal, especially where high quality is required, appears to be unavoidable in the USSR.

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~~III.~~ (Part V) Industry and Materials

A. Chronological history of the activities since the war in the petroleum industry of the USSR is set forth below and discussed in two phases:

A. Exploration and Production

B. Refining and Processing

A. Exploration and Production

Background Statement

In common with other industries in the USSR the long-term growth of the Soviet petroleum industry has been subjected to violent fluctuations caused by revolutions and political instability. Although Russia was the leading oil-producing country of the world in 1901, with 51% of the world total, the political instability incident to the 1905 revolution lowered Russia's oil production to only 26% of the world's total in that year. Russia's oil production never surpassed its 1901 peak of 11.56 million metric tons until 1928, after declining to a low of only 3.78 million tons in 1921, when it comprised less than 4% of the world's total.

Since 1900, the only period of normal growth in Russia's petroleum production was the period preceding World War II, when it rose from 21.48 million metric tons in 1933 to 31.15 million metric tons in 1940 or an average annual growth rate of 5.45 %. The strongest gain however, occurred during the first part of this period before the political purges of the latter 1930's. During this pre-war period, 1933-40, the USSR Produced about 10 percent of the world's petroleum.

During World War II petroleum production in the USSR fell disastrously, somewhat as it had during and following World War I and the Russian refolution. In the post-war

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period 1945-49 it rose rapidly from 19.4 million metric tons in 1945 to 33.4 million metric tons in 1949, an average annual growth rate of 14.45 %. This latter rate compares with an average annual growth rate of 17.41 % from 1921 to 1928 when the USSR petroleum industry was rehabilitated and restored following the political upheavals of World War I and the Russian revolution. It may be assumed that beginning in 1950, USSR petroleum output will resume a somewhat more normal growth rate than in the period of rehabilitation and restoration, 1945-49, following World War II. It is important, however, when forecasting petroleum production in the USSR, to focus attention on the violent fluctuations in output which have marked the past 50 years due to the inherent political instability in that country. Output may decline rapidly and unpredictably, but, after restoration, annual growth is dependent upon the same factors which control the growth of petroleum production in other countries, which are (a) the geologic potential for petroleum resources; (b) the capabilities to find, develop, produce, transport and process those resources; and (c) the demand or need for petroleum products.

1. Dates of changes in industrial activities, their exact nature and implications. Date of changes in production schedules and any evidence of sudden changes in plans.

a. The post-war restoration and rehabilitation of the USSR petroleum producing industry was completed in 1949 when, for the first time, output exceeded the pre-war level. This post-war period, 1945-49, showed a rapid rise in petroleum production in the USSR from the abnormally low value of 19.4 million metric tons in 1945 to 33.3 million metric tons in 1949. This was equivalent to an average annual growth rate of 14.46 percent. The average annual growth since 1949, has been at the rate of 11.60 percent, based on the current CIA forecast of 52 million metric tons of crude oil and natural gas liquids in 1953.

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b. One reason for the relatively high current annual growth rate of 11.60 percent in petroleum production in the USSR since 1949 can be attributed to the conservation of natural gas liquids produced in oilfields, which had been largely wasted prior to this period. A current unfinished study [redacted] 25.13 Production of Natural Gas and Natural Gas Liquids in USSR) indicates a probable increase in the production of natural gas liquids from about one-half million tons in 1950 to about 4 million tons in 1953. On this assumption the average annual growth rate in crude oil production during the current 1950-53 period is of the order of 8.4 percent. This is substantially below the annual growth rate of 14.46 percent during the period of rehabilitation and restoration, 1945-49, but it is substantially greater than in the pre-war normal growth period 1933-40 when it was 5.45 percent. Production of natural gas liquids was negligible prior to 1950. It is the same as the annual growth of crude oil production in the free world of 8.4 percent for the period 1950-52. During this latter 3-year period the USSR produced 7 percent of total world production of crude oil and natural gas liquids.

c. Since 1945 there has been a geographic shift of about 20 percent of the USSR petroleum production. In 1945 about 69% of the total was from the Caucasus (Economic Regions IV and V) and 14 percent from the "Second Baku" (Economic Regions VI and VIII). In 1953 it is believed that only 50 percent of the total USSR petroleum production will be from the Caucasus and that 35 percent will come from the "Second Baku". This post-war shift in petroleum production from the Caucasus to the less vulnerable and more highly industrialized "Second Baku" region is of military and economic significance. Since 1950, however, off-shore development in the Caspian Sea and the Turkmen oil development east of the Caspian Sea has tended to offset to some extent the rapid increase

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in the relative growth of petroleum production from the "Second Baku".

3. The major problems encountered in the industry, starting with January 1946.

a. "Conservation" or conservation of natural gas and natural gas liquids produced with crude oil has been one of the major problems of the USSR petroleum industry since 1946. Increasing emphasis and success has marked the conservation program since 1950. The natural gas liquids produced in rapidly increasing quantities account for about one-third of the total increase in the annual petroleum production rate in 1953 compared with 1950. This conservation program has required the construction of a network of natural gasoline absorption plants throughout USSR oilfields and the installation of separators and other items of hermetic equipment.

b. Off-shore drilling and production in the Caspian Sea is an important problem encountered and largely solved by the USSR petroleum industry since 1946, although limited off-shore operations were under way before that time.

c. Changes in "norms" of production within the industry.

The only well-maintained norm in the petroleum producing industry is the drilling rate for widely oil and gas wells. Compilation of post-war data for the entire USSR petroleum industry is not available. However one study 1/ covering the Ural-Volga region does show a steady increase in average drilling rate from 420 meters per rig-month in 1946 to 1180 meters per rig-month in 1952. As shown in the following tabulation from this cited study, the percent increase in drilling speeds has declined

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Year	Average drilling rate Meters per rig-month	Percent increase over Previous Year
1946	480	
1947	496	3
1948	650	31
1949	760	17
1950	94[illegible]	25
1951	1100	16
1952	1160	5

It is believed that the increase in drilling speeds during the post-war period for the USSR as a whole is somewhat lower than for the newly developed Ural-Volga region tabulated above although constant efforts are being made to raise the norms for drilling crews in the Caucasus oil fields.

4. The available estimates of the annual volume of production of the principal products of each industry since 1945 and the divergence between plan goals and achievement.

a. Estimates of crude oil plus natural gas liquids production by years 1945-52 and forecast for 1953 is shown in Table I. Footnotes to Table I give sources and methodology.

TABLE I

ESTIMATES OF THE ANNUAL PRODUCTION OF PETROLEUM (CRUDE OIL PLUS NATURAL GAS LIQUIDS) IN THE USSR FOR YEARS 1945 - 1952 AND FORECAST FOR 1953. a/

Quantities in million metric tons.

Year	Annual production as percentage of (year).	Assumed range of performance Minimum	Assumed range of performance Maximum	Indicated quantity range Minimum	Indicated quantity range Maximum	Indicated quantity range Median	Other Quantity Estimates	Final Quantity Estimates	Remarks
1945	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	19.4 b/	19.4	Includes negligible quantities of natural gas liquids.
1946	112 c/ (1945)	111.5	112.4	21.63	21.81	21.73		21.7	" " "
1947	119 c/ (1946)	118.5	119.4	25.63	26.04	25.86		25.9	" " "
1948	113 c/ (1947)	112.5	113.4	28.83	29.53	29.22		29.2	" " "
1949	114 c/ (1948)	113.5	114.4	32.72	33.78	33.31		33.3	" " "
1950	113 c/ (1949)	112.5	113.4	36.81	38.31	37.64			
1950	122 c/ (1940) d/	121.5	122.4	37.79	38.07	37.94			
1950	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	37.6 e/	37.8	Includes up to 0.5 million metric tons of natural gas liquids.
1951	112 f/ (1950)	111.5	112.4	42.15	42.49	42.32			
1951	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	42 g/	42.1	Includes about 1 million metric tons of natural gas liquids.
1952	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	47 g/	47	Includes about 3 million metric tons of natural gas liquids.
1953 (Forecast)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.		52 h/	Includes about 4 million metric tons of natural gas liquids.

Note: For 1946 to 1949 and for the first item under 1950, the indicated minimum and maximum quantities are the assumed minimum and maximum percentages applied to the previous years indicated minimum and maximum quantities. The indicated median quantity is the announced percentage applied against the previous years median quantity except for 1946 which is applied to the 1945 estimate of 19.4 million metric tons.

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5. The major sources of the annual increases in production within each industry.

There are 3 major sources for the post-war increases in the USSR production of petroleum and natural gas. They are briefly presented under paragraphs (a), (b) and (c) below.

(a) For period 1946-49 an important factor was the restoration and rehabilitation of war-damaged producing properties in the Caucasus.

(b) Throughout the post-war period the Second Baku has contributed a steadily increasing proportion of USSR petroleum production. This area and the relatively rapid development therein is probably the most important single source of the post-war increase in petroleum production in the USSR.

(c) For the period 1950-53 the conservation of natural gas liquids which were formerly wasted has accounted for about one-third of the increase in petroleum production during this period.

6. The estimated annual increases in productivity and labor force in the industry since 1945 and the sources.

25X1 No data have been compiled [redacted] on the size and productivity of the labor force in the petroleum producing industry in the USSR. Available information on drilling rates during the post-war period is presented under 3, Changes in norms of production within the industry.

7. Specific difficulties encountered in fulfilment of plan goals since 1945.

The 1950 goal for petroleum production was over-fulfiled so it may be assumed that the difficulties encountered were those normally attending oil exploration, development and production. The 1950 goal for natural gas production in terms of gas conserved and utilized was grossly underfulfilled (56 percent of goal). This was entirely due to lack of natural gas trunk pipelines to transport the gas produced and wasted in the oil-fields to distant markets.

6. Are the specific goals of the Fifth Five-Year Plan realistic?

As shown in Table III the current forecasts for 1955 indicate that the 1955 targets of The Fifth Five-Year Plan will be fulfilled 89 percent for petroleum (crude oil plus natural gas liquids) and 84 percent for natural gas. These forecasts are subject to frequent revision.

COMPARISON OF ESTIMATES AND FORECASTS OF USSR PETROLEUM AND NATURAL GAS PRODUCTION WITH FIFTH FIVE-YEAR PLAN GOALS.

Quantities in Million metric tons

Year		Estimates and Forecasts: Crude Oil Quantity	Natural Gas Liquids: Quantity	Natural Gas Liquids: % by weight of crude	Total Petroleum Quantity	Natural Gas*: Quantity	Natural Gas*: % by weight of petroleum	Fifth Five Year Plan Goals: Petroleum: Quantity	Petroleum: Percent Fulfillment	Natural Gas: Quantity	Natural Gas: Percent Fulfillment
1950	Base Year	37.5 b/	0.3 b/	0.80	37.8 a/	3.90 e/	10.31	37.8 g/	n.a.	3.9 h/	n.a.
1951	1st Year	41.0 b/	1.1 b/	2.68	42.1 a/	4.22 e/	10.02	42.7	99	5.1	83
1952	2nd Year	44.0 b/	3.0 b/	6.82	47.0 a/	4.7 e/	10	48.3	97	6.7	70
1953	3rd Year	48.0 b/	4.0 b/	8.33	52.0 a/	5.7 e/	11	54.7	95	8.8	65
1954	4th Year	51.8 c/	5.1 d/	9.84	56.9	7.4 f/	13	61.8	92	9.9	75
1955	5th or Target Year	56.0 c/	6.4 d/	11.35	62.4	9.4 f/	15	69.9	89	11.2	84

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h/ Natural gas produced and utilized. Does not include natural gas wasted.

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Table III - Footnotes

a/ Data from Table I.

b/ Tentative distribution of crude oil and natural gas liquids pending

25X1 completion of [redacted] 25.13 Production of Natural Gas and Natural Gas Liquids in the USSR.

c/ Based upon continued annual growth in crude oil production of 8.4 percent.

d/ Based on continuation of hermetization resulting in annual increase of natural gas liquids of 1.51 percent by weight of crude oil.

e/ Data from Table II.

f/ Based on continuation of expansion of capacity of gas trunk lines resulting in annual increase of 2 percent by weight of petroleum.

g/ Fifth Five-Year Plan calls for an 85 percent increase in output of oil during the 5-year period 1951-1955. This is equivalent to an average annual growth rate of 13.09 percent. This annual growth rate is assumed for the intermediate annual goals.

h/ The Fifth Five-Year Plan states: "To increase in three years by approximately 80 percent the production of natural gas and of oil gas that goes with oil production, as well as the production of gas from coal and shales." The Plan also states: "To provide for an increase of .... conveyance by pipeline approximately five times." An 80 percent increase in gas production in 3 years is equivalent to an annual growth rate of 31.04 percent. This rate has been applied to the first 3 years, 1951-1953 of the Fifth Five-Year Plan to obtain the annual goals for natural gas production for 1951-53. This assumes that expansion of natural gas production was planned to beat the same rate as gas from other sources. This results in a 1953 planned production of 8.8 million metric tons of natural gas, equal to 16.09 percent by weight of petroleum production (crude oil plus natural gas liquids) amounting to 54.7 million metric tons planned

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for 1953. It is then assumed that expansion of natural gas production in 1954-55, after the initial 3-year period of natural gas pipeline expansion, will parallel the planned output of petroleum. On this assumption the natural gas production for 1954-55 is forecast as 16.09 percent of the petroleum production for those years.

Table III - Note on Methodology

Estimates and forecasts of production of natural gas and natural gas liquids in Table III (and also in Tables I and II), are based on the pattern of reserves of crude oil, natural gas liquids and natural gas in the United States, modified by studies to date under [redacted] Project 25.13, on the pattern of similar resources in the USSR. It is clear from these studies that the current US pattern of reserves of these petroleum hydrocarbons can be accepted as a limiting one with respect to actual or potential short-term (3-5 years) availability of natural gas liquids and natural gas in the USSR.

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The pattern of reserves of petroleum hydrocarbons in the US as of December 31, 1952 is as follows:

Petroleum Hydrocarbon	Proved Reserves Millions Metric Tons	Percent of Total
Crude oil	3797.4	68.69
Natural gas liquids	526.4	5.69
Natural gas	1671.2	25.62
Total Petroleum hydrocarbons	6995.0	100.00

In percentage by weight of crude oil, the natural gas liquids shown in the foregoing table comprise 13.86 percent and the natural gas comprises 120.38 percent. Most of the natural gas in the US is in natural gas deposits. Only 1137.2 million metric tons or 37.65 percent by weight of the crude oil is associated with or dissolved in crude oil in oil deposits.

In the USSR the percentage in terms of weight of crude oil shown in Table III for 1955 for natural gas and natural gas liquids are believed to represent the probable limits for the conservation of these resources by that time. The figure for natural gas liquids of 11.35 percent approaches that in the US because the recovery of this component depends only upon the installation of relatively simple field plants and equipment. On the other hand the recovery and utilization of natural gas depends upon the construction of natural gas trunk pipelines to distant markets, so that it is assumed very substantial quantities, on the order of one-half the natural gas produced with oil in the USSR in 1955, will still be wasted. However, if the Fifth Five-Year Plan goal for increasing conveyance by pipeline five times is met with respect to natural gas lines, the natural gas produced and utilized would be up to double that shown for 1955 in Table III. It is not believed that the pipeline construction program envisaged in the Fifth Five-Year Plan can be achieved but no exhaustive study of this problem has been made.

9. Limiting factors which will tend to slow industrial growth in the future. When will these begin to operate?

a Geologic potential for petroleum resources.

This is the one factor which will inevitably limit petroleum production in any oil-producing country. Current appraisal of this factor does not indicate that it will seriously limit the short term (3 to 5 years) availability of petroleum production in the USSR.

b Capability to find, develop, produce, transport and process petroleum resources.

Finding and developing petroleum deposits in the USSR is gradually becoming more difficult as exemplified by deep drilling through hard strata in the Second Baku and off-shore operations in the Caspian Sea. This trend toward the development of

deeper and more inaccessible deposits will continue without important change for the short term.

g. Transportation of crude oil to refineries has always been a limiting factor with respect to specific oil-producing regions in the USSR. The current pipeline and refinery construction program is expected to aid but not greatly ameliorate this condition for the short-term trend. It may be that the pipeline construction program on natural gas lines will be accelerated enough during the next 3 years to expand substantially the use of natural gas produced with oil which would otherwise be flared to the air.

B. Refining and Processing

Background Statement

In comparison to western practices the Soviets have been consistently late in the construction of modern types of refining units. Pipestill apparatus for continuous crude distillation did not become available in the USSR until after the revolution (1917). However, pipestill furnaces, fractionating columns, and other continuous flow equipment then began to be featured in the new Soviet units. Thermal cracking systems were installed in 1920 and these comprised the first Soviet conversion facilities. Due to increased requirements for better qualities and higher relative yields in gasoline stocks, the Soviets had special need for the typical conversion processes such as cracking, reforming, and gas reversion. Since the 1920's the Soviets have continued modernizing their natural petroleum refineries in this respect. By 1950 the transformation of facilities seems to have been at least complete enough for Soviet requirements.

The first USSR conversion units of catalytic types were constructed about 1940, and these units were all of American origin. At later date there were more extensive catalytic facilities designed and partially installed under Lend-Lease arrangements

with the USA. Installations of American origin collectively comprised the only catalytic refining apparatus definitely known to have been existing in the USSR in 1950. Although the USSR catalytic installations in total then had small capacity compared with similar US facilities, they provided significant potentials for the production of high octane avgas components. These facilitiesmoreover constituted the only Soviet natural petroleum refining apparatus then clearly identified to be existing for such production. It is noted that American design or construction also account for most of the Soviet thermal conversion facilities, predominantly for cracking, insofar as they were installed prior to the close of World War II.

1. The Soviet petroleum processing industry conforms to the normal rule in fundamental aspects. Soviet natural petroleum refining practice has been resolved from the availability and quality of natural crude oil. The synthetic oil industry is auxiliary, furnishing petroleum products only when needed to supplement the yields from natural crude, or otherwise in certain cases when the petroleum products have practical origin by synthetic processing. The natural petroleum refining and synthetic oil industries comprise the overall petroleum processing industry. The petroleum processing industry keeps pace with the availability or lack of availability of natural petroleum.

In the post-war period there has been steady progress in the petroleum processing industry in the USSR. There is no evidence of abrupt changes in the pertinent industrial activities. There is no evidence of sudden changes in production schedules or operating plans. Since the war, the processing production schedules have been determined by the increases in natural petroleum availability.

Prior to the war, the natural petroleum refining industry was very backward and undeveloped and the extent of the synthetic oil industry was effectively nil. The then existing USSR natural petroleum refining facilities were in a large part destroyed or badly damaged during the war. Available intelligence shows that replacement and rehabilitation of such facilities was in advanced stages of completion by 1949. In 1950 there was direct evidence of the effects of considerable modernization and increased efficiency in the expanding USSR natural petroleum refining practice. These effects are indicated to have continued to increase in consequence during 1951 and 1952.

The Soviets appear to have made very slow progress in fulfilling their announced plans for synthetic oil development. This relatively small progress has probably resulted from a higher priority placed upon the natural petroleum refining facilities.

The post-war trend is evidently much as proposed in the "law" for the Fourth Five-Year Plan. 1/ These published proposals were very much generalized and were mainly (a) to expand the production of high octane aviation gasoline; (b) to improve the qualities in motor gasolines, kerosenes, Diesel fuels, and lubricants; (c) to increase the relative product yields by reducing losses and by introducing on a wide scale the use of catalytic and other modern methods of processing; (d) to construct about 20 new but ambiguously defined petroleum processing plants, and to rehabilitate three others; and (e) to increase the synthetic oil product yield to 900,000 metric tons in 1950, using coal and oil shale as raw materials.

Available intelligence shows that much improvement and expansion had been made by 1950 in the USSR natural petroleum refining facilities, and that further progress continued along these lines in 1951 and 1952. It is possible to estimate the total quantitative potentials which existed in the USSR natural petroleum refining complexes

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at major sites in 1950. However, the available data are inadequate for a definite identification of a particular number of new plants. As noted later, the actual 1950 operations probably fall far short of the published plan goal for synthetic oils.

It is fairly well evident that the manufacture of synthetic oil products is secondary to natural petroleum refining in Soviet plans. The major Soviet interest in natural petroleum processing is quite logical in view of the increasing availability of the USSR natural crude oils. The present review will therefore relate primarily to the natural petroleum refining. It is noted, however, that Bergius hydrogenation and Fischer-Tropsch synthesis types of catalytic synthetic oil plants have been planned, and have been under construction since the war in the USSR. Some operation of these plants is estimated to have occurred in 1952, and the plants may be in full operation in 1953.

When the total production from such plants is available, together with the synthetic oils from oil shale, the Soviet production of the shale oil synthetic stocks being chiefly confined to Estonia, the Soviets will have a significant potential in synthetic oils. The Bergius plants have special importance in a potential for producing high octane aviation gasoline. In the published "draft directives" for the Fifth Five-Year Plan, a proposal is formulated to develop the production of synthetic oils as a general matter. 2/ No details are given for the planned development except for the statement of a goal to increase the Estonian shale oil production by 80 percent over 1950 in 1955. Nevertheless it is generally apparent that the Soviets plan to concentrate upon the natural petroleum refining operations, and devote only secondary attention to the synthetic oils.

2. In Soviet petroleum processing the major problems fall within three general classes which relate to (a) technique developments and equipment designs; (b) manufacture

and procurement of equipment; and (c) availability of operating personnel.

In the first class the problems are concerned with the attainment of optimum results in products. The second group of problems refers to equipment availability for maintenance and reconstructions of previously existing plants, and constructions of complex new facilities. These reconstructions and new constructions are as planned for the optimum operations, being involved in a program to handle the natural crude oil which has been continuously increasing in quantity. In the third class of problems, the interest is in the training of operating personnel for handling the complex new techniques. The particular reference is to the intricate catalytic operations.

In the various fields of applied chemical engineering technology, the successful operations are normally developed by laboratory research and subsequent pilot plant operations. There is much evidence that this procedure is followed in Soviet petroleum processing. The evidence is contained in direct intelligence reports and in the voluminous reference material which is constituted by recent Russian technical publications. The Soviet technologists generally make free and fundamental use of the highly modernized practices of the West. Some ingenuity is featured in the Soviet engineering studies, in the adaptations of Western practices to the Soviet ideas and needs. Many of the Soviet petroleum research technologists are undoubtedly competent. These technologists generally cut corners and save time by starting out with the principles which the industries in the West have previously formulated and proved.

The general design of Soviet petroleum process equipment seems to be a compromise between the well qualified technology which is evident in Soviet literature, and the limited availabilities of complex equipment items and special quality materials. The general designs appear to reflect further improper simplifications in order to meet

other limitations. The other limitations refer to Soviet personnel having the technical and manual capabilities required for operation. As a result of these compromises the modernization of the Soviet petroleum processing has been gradual. The progress has not been revolutionary even though the rate has been significant.

3. In petroleum processing the "norms" of production generally fall within five general classes as follows: (a) total yield of useful petroleum products; (b) total yields of particular type and quality petroleum products; (c) relative yields of such products from available charge stocks; (d) relative yields of such products upon the basis of processing costs, per unit of equipment and per unit of capital and labor expenditures; and (e) relative type and quality characteristics prevailing in each yield correlation.

Only the first and second classes of norms are generally covered by data sufficient for intelligence correlation. Available information on the other classes of norms is largely a matter of generalized deductions. Even the data on the first two classes is highly limited. The applicable data usually develop from published percentages. The typical data give the annual yields by types of products, expressed in terms of percentages referred to prior annual productions. The prior annual productions are generally those immediately preceding.

This sequence of percentages is often incomplete in recent years. The quantitative base in the year from which the sequence starts is seldom if ever definitely established. This causes considerable variation in the intelligence estimates of annual product quantities. Further, the fundamental characteristics of the reported product types are seldom adequately identified. In the reported data themselves it is often apparent that a given type does not always refer to the same varieties of separate component stocks.

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There is no evidence of other than gradual changes in the norms of product yields. The Soviet objectives are generally to increase (a) the total and relative product yields in the general ranges as above noted, (b) the specific relative yield of gasolines and intermediate distillates, giving a corresponding decrease in the relative yields of residual fuel oils, and (c) the quality ratings in the product stocks, moderate increases have been apparent in all of these respects since the war. The total yield increases are generally more than would be shown by direct correlations with the estimated increases in synthetic oil and natural petroleum productions.

The matter of quality characteristics is particularly uncertain. There are

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various lines of evidence to show that the published quality data may be none too realistic, and that the actual products apparently tend to have lower quality ratings.

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Estimated Productions of Total Petroleum Distillates in the USSR a/

Stock and Year of Production	Thousands of Metric Tons Components	Total
Gasolines		
1946 Total		5,030
1947 Total		6,680
1948 Total		7,490
1949 Total		8,290
1950 Total		9,817
1951 Total		11,811
From natural petroleum	10,711	
From natural gas liquids	1,100	
1952 Total		14,833
From natural petroleum	11,495	
From natural gas liquids	3,000	
From synthetic oils	338	
Intermediate Distillates		
1946 Total		5,100
1947 Total		6,440
1948 Total		7,670
1949 Total		9,160
1950 Total		9,067
From natural petroleum	8,896	
From synthetic oils	171	
1951 Total		9,955
From natural petroleum	9,738	
From synthetic oils	217	
1952 Total		10,595
From natural petroleum	10,450	
From synthetic oils	145	

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a/ In years prior to 1950 the Soviet productions of synthetic oils and natural gas liquids are considered to be at no consequence for the present purposes. It is considered that the synthetic oil distillates from oil shale should be classified as intermediates prior to 1952. In 1952, however, it is probable that the shale oil operations had been improved so that some of the derived distillates should be considered as gasoline stock. A large part of the estimated 1952 synthetic oil distillates being derived from the new catalytic facilities, it is presently estimated that 70 per cent of the total 1952 synthetic distillates was gasoline product. The estimated 1950 recovery of natural gas liquids was relatively small, and is here considered to have had the status of a separate fuel. Subsequently to 1950 it is probable that the recovered natural gas liquids were properly within the classification of special gasolines.

5. For annual production increases in the Soviet petroleum processing industry, the primary sources are in two categories: (a) increases in natural petroleum productions, and (b) expansions in production facilities not handling natural petroleum (i.e., synthetic oil plants). The second primary source category has been unimportant. However, there are directly dependent sources of the increases, and these include: (a) minimum new refining facilities to process the increased natural petroleum production, and (b) improvements in the processing operations and installed facilities. The latter improvements serve for more efficient yields of products with less material loss, and in particular give larger relative yields and higher quality ratings in the desired distillate products.

As previously noted, one basic goal in Soviet processing is a larger relative yield of the gasoline and intermediate distillate stocks. This goal is especially attainable by catalytic conversion refining. Natural petroleum catalytic conversion

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was initiated in the USSR by means of World War II facilities of American origin, including the Lend-Lease Houdry catalytic cracking-alkylation projects. In Soviet technical literature and in direct reports, there is evidence of a probability that the Soviets have been continuing with the installation of catalytic conversion refining for natural petroleum stocks. At the present time, however, it is not possible to designate definite sites and capacities for such additional catalytic units. Mention has already been made of the past and current Soviet installations of catalytic synthetic oil plants of the Bergius and Fischer-Tropsch types.

There is actually little reason to believe that the Soviets require maximum yields and ultimate high qualities in gasolines, comparable to that resulting from catalytic refining in the USA. Without these requirements in gasolines, larger percentages of the total naphthas are in general obtainable from natural petroleum if the use of catalytic conversion is less extensive while the use of thermal visbreaking is more prevalent. To attain a relative standing in catalytic refining similar to that in the US, the Soviets would be confronted with an exceedingly heavy demand for equipment and operation skills of highly specialized character.

6. No correlation has been prepared [redacted] pertinent to the requirements or 25X1
utilization of labor in the Soviet petroleum processing industry. It appears that if a consistent and significant correlation is prepared for annual productivity increases in this industry, the correlation will be restricted at present to the total yields by types of distillates. Table IV shows this sort of comparison in terms of percentage increases referred to the preceding year in each case. Table IV is derived from the estimates given in Table III.

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Table IV

Estimated Percentage Increases in Annual Petroleum Distillate Yields in the USSR

Year of Annual Production	Percent Increase Relative to Preceding Annual Yield	
	Gasolines	Intermediate Distillates
1947	32.8	26.3
1948	12.1	19.1
1949	10.7	19.4
1950	18.4	- 1.0
1951	20.3	9.8
1952	25.6	6.4

7. Production plan goals are stated for the Soviet petroleum processing industry only in the case of synthetic oils. There is evidence that the Soviets may have published these specific synthetic oil goals with tongue in cheek. Natural petroleum refining is probably the main center of interest in this industry. Sustained trends with due features of flexibility are apparent as already described in the natural petroleum refining.

Until recent time the specific difficulties in these sustained trends appeared to have related to the limitations in availabilities of (a) the more complex and specialized items of refining apparatus, and (b) the supervisory and labor forces having the required technical and manual capabilities for plant operation.

The Soviets seem to have solved satisfactorily the essential and particular technological problems in regard to the processing of the USSR natural crude oils.

As previously inferred, however, improper modifications appear to have been made in actual commercial designs to meet the two types of unavailabilities listed

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above as specific difficulties. Necessity seems to have forced the specification of substitute or less applicable equipment if the plants were to be actually installed. Undue simplification also seems to have been forced into some of the commercial designs to arrive at a technique within the capabilities of the available operating personnel at the plant level. The reported inferior product qualities would be a logical result of such conditions.

The two types of specific difficulties were quite frequently evident in the intelligence prior to 1952. In 1952 there was considerably less evidence of these specific problems. It is not improbable that the difficulties are rapidly decreasing in degree and will be unimportant factors by the close of 1953.

8. The Fifth Five-Year Plan text contains the following commitments in regard to natural petroleum refining in the USSR. 2/ The respective commitments were (a) "to create in advance, reserves in the construction of petroleum refineries"; (b) "to insure the development of the oil refining industry in conformity with the projected increase in the production of oil, bringing the oil refineries closer to the districts using oil products"; and (c) "to increase in the course of the Five-Year Plan the capacity of primary refining plants by approximately 2 times and of crude oil cracking plants by 2.1 times, envisaging a substantial acceleration of oil processing and greater extraction of light oil both at operating and newly commissioned oil refineries". The Fifth Plan references to synthetic oils have already been noted.

25X1 The current [redacted] estimate is 44,920,000 metric tons per year (about 898,400 barrels per calendar day) for the installed natural crude oil distillation capacity in the USSR, basis 1 January 1953. The Fifth Plan commitment is for an average increase in this type of installed capacity, equal to 20 percent of the 1950 value during each year in the five-year period. The commitment calls for 89,840,000 MT/Y (1,796,000 BPCD) as

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the value of the capacity, basis 1 January 1956. This represents a linear average increase per year in the installed capacity of 8,984,000 MT/Y (179,680 BPCD).

25X1 The current [redacted] estimate of natural petroleum production in the USSR in 1950 is 37,500,000 MT/Y (750,000 BPCD) of natural crude oil, plus 300,000 MT/Y of natural gas liquids. The Fifth Plan draft directives call for 65 percent increase above such 1950 production rates in 1955. 3/ Upon the basis of [redacted] estimates for 1950, this 25X1 commitment is for about 70,000,000 MT/Y (1,400,000 BPCD) of the natural petroleum in 1955. The commitment quantity as thus stated was later confirmed in an official Soviet Government report. 5/ However, the current [redacted] forecast for probable USSR 1955 natural 25X1 petroleum production is 56,000,000 MT/Y (1,120,000 BPCD) of natural crude oil, plus 6,400,000 MT/Y of natural gas liquids.

For practical balance on a national basis, the installed natural crude oil distillation capacity is normally 20 percent in excess of the natural crude oil

25X1 production. Thus for [redacted] forecast of the 1955 natural crude oil production, the average available installed natural crude oil distillation capacity in 1955 should be 67,200,000 MT/Y (1,344,000 BPCD). This installed capacity would be 22,240,000 MT/Y

25X1 (445,600 BPCD) above [redacted] estimate for the 1950 value, and would need to be installed in the five-year period, 1951-1955, inclusive. Assuming the capacity increase to be attained in the equivalent of 4.5 years to provide average availability in 1955, the linear average increase per year in the installed capacity would be 4,951,000 MT/Y (99,020 BPCD). The average increase per year would be equal to 11 percent of the estimated 1950 value.

Upon the basis of the apparent results attained since 1945, it is probable that the Soviets have capabilities (a) to adequately expand processing installations so as to handle the increased indigenous natural petroleum productions, insofar as the

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latter are in prospect through 1955 according to [redacted] forecasts; and (b) to also maintain in that expansion the current rate of progress in the modernization of the installations. For the total increase in the installed capacities according to the Fifth Plan, it is possible that the essential constructions could be made but it is probable that the modernization program would be much retarded.

The installed USSR natural crude oil distillation capacity is reported to have been 36,800,000 MT/Y (736,000 BPCD), basis 1 January 1941. 6/ It is probable that this installed rating did not change radically during the war and prior to 1 January 1945. Due to war damage, it is probable that the Soviets effectively replaced at least a third of the previously existing petroleum processing facilities, and there is evidence as already inferred that this was accomplished prior to 1 January 1951. Therefore, in the six-year period, 1945-1950, inclusive, it would appear that the Soviets installed the following capacity for natural crude oil distillation in terms of MT/Y: 44,920,000 less 36,800,000, plus a third of 36,800,000. This total capacity installation is equal to about 20,420,000 MT/Y (408,400 BPCD).

One statement contained in the Beriya official speech of November 1951 is pertinent. 7/ The actual remarks were: "Work for the building and expanding of oil refineries has developed on a large scale. New works equipped with first-class Soviet technique which began to work this year, can by themselves process six million tons of oil yearly." This cryptic statement could mean either that construction work was started on such plants in 1951, or, more probably, that the plants began to operate in 1951 so as to provide the additional capacity as quoted. It is presently inferred that virgin charge in natural crude oil distillation units is represented by this additional capacity of six million metric tons, equivalent to about 120,000 BPCD. It is believed

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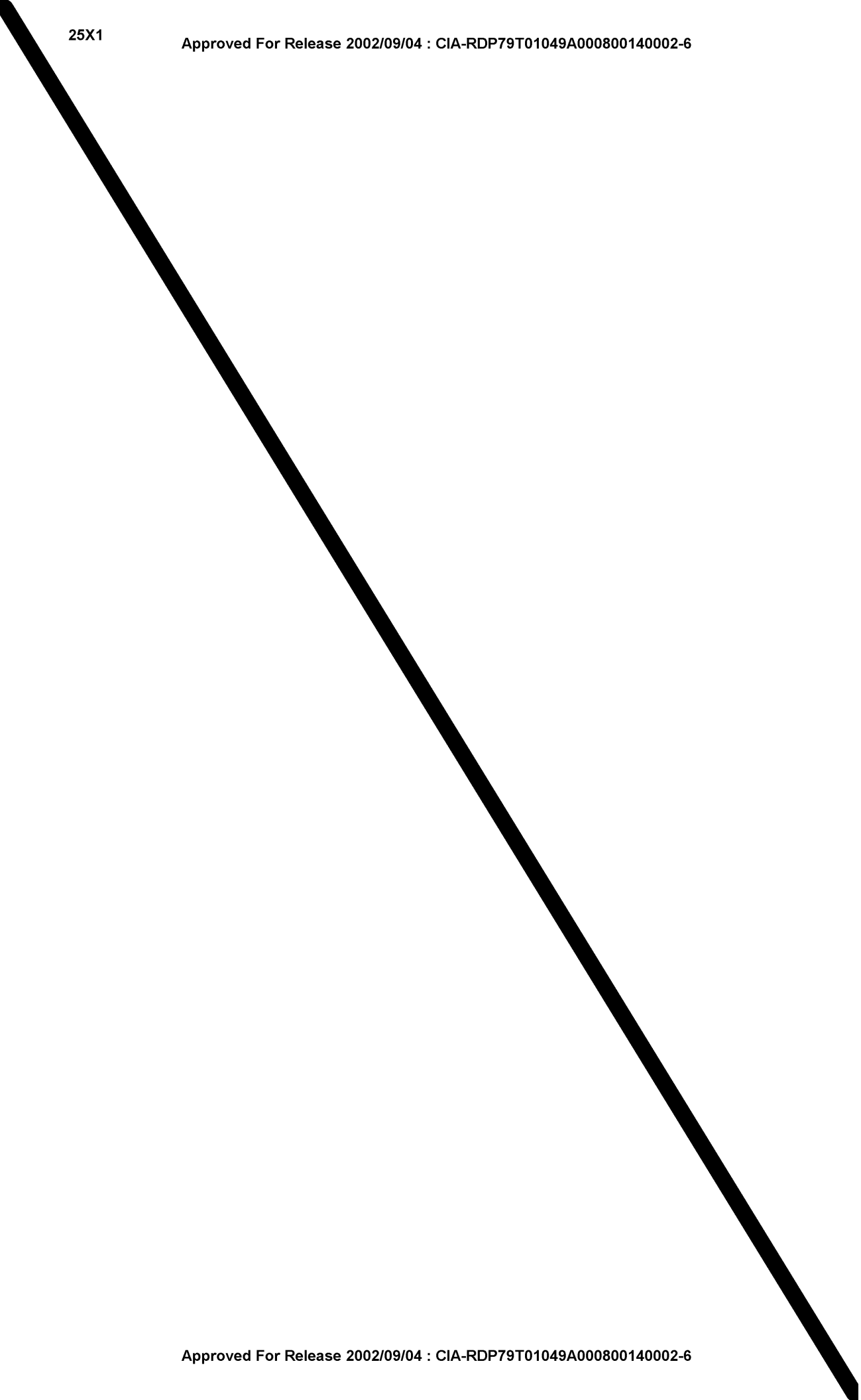
that if Beriya's statement was truthful, the actual reference was to facility constructions initiated in previous years, finally becoming the installation completions for 1951 in a continuous program of expansion.

9. Limitations in natural crude oil availability are the primary limiting factors for the growth of the Soviet petroleum processing industry. The direct limiting factors for this phase of the industry have been analyzed in the preceding discussion. No particular time can be predicted for the effects of limiting factors in regard to the petroleum processing industry in itself.



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V. Industry and Materials: [redacted] Metals

1. There has been a definite uptrend in the production of copper, lead and zinc in the USSR since the war. The 4th Five Year Plan for the production of copper is believed to have been exceeded and the goal for lead production just about reached. The planned increase in the production of zinc was retarded on account of two large zinc plants having been destroyed or badly damaged by the Germans when they overran the Ukraine and the Caucasus. These plants have subsequently been rebuilt and are now in operation.

An increase in the production of copper, lead and zinc from mines, mills and smelters is not susceptible to sudden changes unless a new enterprise which has been under development and construction comes into full production at a given time. A gradual increase in production however is to be expected in the mining industry if the ore bodies warrant further expansion.

There is no evidence of any sudden changes in the plans during the 1946 - 1950 period.

2. The major problems encountered in the industries were run down machinery and an inadequate supply of repair parts and also inefficient supervision and management as well as labor. This was particularly noticable in the lead and zinc industries as indicated by excerpts from the Soviet press.

3. The changes in norms or planned production within each of the mining industries could very well happen, but there is no evidence to indicate that such has been the case. Any sudden change upward in the norm would have a tendency to discourage labor, particularly if the norm was set too high and beyond reach.

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Estimated Production of Copper, Lead and Zinc in USSR, 1945 - 52

Year	Copper (1000 metric tons)		Lead (1000 metric tons)	Zinc (1000 metric tons)
	Primary	Secondary		
1945	160	25	40	50
1946	170	25	48	54
1947	185	30	63	59
1948	200	30	76	81
1949	225	35	90	103
1950	240	35	100	100
1951	250	35	100	105
1952	287	39	117	130

5. The major sources of annual increases in copper, lead and zinc, by regions, follows:

Copper:

Economic Region XA

Kazakh S.S. R. - Balkash and Dzhezkazgan.

Economic Region XB

Uzbek S. S. R. - Almalyk area.

Lead and Zinc:

Economic Region XA

East Kazakhstan - Altai area

Alma Ata - Tekeli area

Economic Region XB

Uzbek S. S. R. - Almalyk area.

Economic Region XII

Maritime Territory - Tetyuke area

Zinc:

Economic Region XA

East Kazakhstan - Altai area.

Comment: There is a large production of copper in Economic Region VII (Urals), but this region will do well to hold its own. This region is an old copper producing area and is believed to have reached its peak in production. The mines are all underground operations and are becoming deeper as the upper portions of the ore bodies are mined out.

6. Since 1945 great efforts have been made to mechanize the copper, lead and zinc mines which has been accomplished with varying degrees of success. The introduction of labor saving devices such as mechanical shovel loaders and scrapers would increase the productivity of labor when used properly and taken care of, but excerpts from the Soviet press indicated that the underground laborers were reluctant to use this equipment and also some of the equipment was not in use for lack of repair parts. There isn't any question about there having been an increase in labor productivity, but it is difficult to estimate the quantity. As compared with American standards on the same class of work, the productivity of labor in the USSR is believed to be quite low, particularly in the mining operations where most of the labor is employed.

The labor force in the copper, lead and zinc industries from 1945 to at least 1949 was composed of prisoners of war and forced labor with a sprinkling of independents or voluntary laborers. There are no data from which to estimate the annual increase in the labor force since 1945.

7. There were no specific difficulties in the fulfillment of the plans for copper and lead in the 4th Five Year Plan. The necessity of having to rehabilitate the two zinc plants destroyed by the Germans as mentioned before is believed to have prevented the fulfillment of the planned goal.

8. The 5th Five Year Plan for the production of copper, lead and zinc are believed to be realistic, however, there is some doubt as to the fulfillment of plans for lead and zinc. It is believed the copper production goal can be accomplished.

9. The primary limiting factor which would tend to slow-down the growth in the production of copper, lead and zinc in the future, i.e., beyond 1960, is the failure to discover new-large ore deposits.

Other secondary factors which could slow down the growth in the production

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of copper, lead and zinc are:

(1) Transportation facilities.

(2) Unavailable or insufficient water supply

(3) Delays in the delivery of equipment

(4) Failure to have an adequate supply of repair parts.

(5) Lack of skilled labor and technicians.

The importance to the USSR of an adequate supply of copper, lead and zinc within its domain, is such, that these industries would have a priority near the top. It is, therefore, believed that an intensive effort would be made to overcome many of the items listed above.

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TRENDS IN SOVIET ECONOMIC POLICIES SINCE 1945
OFFICE-WIDE PROJECT 0.12

Light Metals

III State Reserves:

The Soviet aluminum industry began in 1932 and was gradually developing in importance when the two major aluminum reduction plants were virtually destroyed by the Germans in 1941. Some plant equipment was salvaged and a new start was made in the Urals during the War, at Kamensk, where a plant had been under construction. The salvation of the Soviet aluminum industrial economy was the U.S. Lend-Lease program which included shipments of approximately 300,000 tons of aluminum ingot to the Soviet Union in 1942-44.

The Soviet aluminum industry was further re-vitalized by Lend-Lease shipments of plant-equipment to the extent the Soviet industry was able to produce more aluminum than its consuming segments could absorb in 1946. Modest amounts were placed in a reserve stockpile each year during the 1946-49 period. At the end of 1950, an estimated 200,000 tons of aluminum was held in reserve stocks. This was in excess of that year's consumption. In 1951 and 1952, it is estimated about 25 percent of the production was available for stockpiling in each year. No release from stocks are believed to have been made in the post-war years and it is expected continued further increases in the Soviet aluminum stockpile will be made through 1954.

V. Industry and Materials:

1. The major change in the Soviet aluminum industry since the war has been the shift in the source of the supply of bauxite, the aluminum ore. The Soviet had previously been dependent on low-grade bauxite from domestic deposits. At the end of World War II, the USSR inherited the vast high-grade bauxite which was accessible either by rail or water transportation from the numerous Hungarian deposits. In 1952, approximately one

million tons of bauxite was imported by the Soviet Union from Hungary.

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2. No major problems have be[redacted] Soviet aluminum industry during the period beginning January, 1948.

3. No changes in "norms" of production within the Soviet aluminum industry have been observed. Process technology is well standardized; using the most modern U.S. and German equipment and adopting trade practices in use through 1945 in these countries.

4. The annual volume of Soviet aluminum production from 1945 through 1952 in 1000's of metric tons is as follows:

USSR Aluminum Production
in 1000's of metric tons
1945 - 1952

Year	Primary Production	Secondary Production	Total Production
1945	86	49	135
1946	112	61	173
1947	125	65	190
1948	135	65	200
1949	155	65	220
1950	170	70	240
1951	200	68	268
1952	225	75	300

5. An increase in production in the aluminum industry of the Soviet Union generally results from the introduction of a new pot-line or series of electrolytic cells which are used to reduce the alumina to aluminum. When these units are in operation they normally produce a constant supply of ingot aluminum which approximates their annual rated capacity. Aluminum plants are large well-integrated facilities, close to, and requiring tremendous amounts of constant electric power. The production capacity of the 7 USSR aluminum reduction plants in 1000's of metric tons of ingot metal is as follows:

Region	Plant	1945	1946	1947	1948	1949	1950	1951	1952
IA	Volkhov	7.5	7.5	15	20	30	30	30	30
IA	Kandalaksha	-	10	10	10	10	10	10	10
III	Zaporozhe	-	15	15	15	15	30	35	35
V	Yerevan	-	-	-	-	-	-	15	15
VIII	Kamensk	60	60	60	60	60	60	60	60

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Region	Plant	1945	1946	1947	1948	1949	1950	1951	1952
VIII	Krasnoturinsk	7.5	7.5	15	20	30	30	30	45
IX	Stalinsk	10	10	10	10	10	10	20	30
Totals		85	110	125	135	155	170	200	225

Some of the increase in aluminum production was due to the installation of Lend-Lease plants. Another significant increase resulted from the introduction of captive German plants which were formerly located at Lauta and Bitterfeld and another segment of the increase was through the restoration of the Volkhov and Zaporozhe plants.

One new plant began producing at Yerevan during the period and another at Cherepovets may possibly have begun production during 1952. All of the aluminum installations showed an increase in production except Kandalaksha, which is an extremely high-cost operation using other aluminum ore sources than bauxite. A noticeable shift in production has been the increased emphasis on the Western Soviet plants at Volkhov and Zaporozhe. These plants are the closest to the high-grade, accessible, Hungarian bauxite.

6. Productivity has remained relatively constant during this post-war period, a normal situation for the aluminum industry. No major innovations in aluminum technology were known to have been used during this period. Much of the labor force is made up of prisoners-of-war and information is not available whereby an evaluation could be made of their work quality or working conditions. The quality and output of the technical and highly-skilled labor is believed comparable to other industries.

7. If an abundant supply of the accessible Hungarian bauxite continues to flow into the Soviet, and sufficient electric power is constantly available, the Soviets should have no major difficulties which could not be readily resolved in order to fulfill the requirements of their five-year plans since 1945.

8. The specific goals of the Fifth Five-Year Plan are unrealistic when approached from the aspect of —— where will the aluminum be consumed? It is not believed probable

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that the Soviet industrial economy can be built-up in such a short time and have the ability to chew-up aluminum at a rate of over 500,000 tons a year. It is possible, that if this Plan-rate is obtained, the stockpile procurement will be increased rather than cutback the Plan-objective, while awaiting for the consuming industry to attain this high absorbtive state for aluminum consumption.

9. The limiting factors which might slow down the Soviet aluminum industry are:-

(a) Shutting off the supplies of Hungarian bauxite which flow into the USSR.

(b) An interruption of the electric power supply to the aluminum reduction plants or a shortage of available power which would drop the power supply below the minimum requirement of the facility.

(c) A lowering of the industrial priority for aluminum and relegating power to another industrial consumer or to industries which can economically operate on high-cost power.

Sections (a) and (b) could occur at any time although the shutting-off of the Hungarian bauxite is a remote possibility unless there are open hostilities. Section (c) is not anticipated until after 1955 and more likely after 1960.

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TRENDS IN SOVIET ECONOMIC POLICIES SINCE 1945
OFFICE-WIDE PROJECT 0.12

Minor Metals

III. State Reserves:

It has been the policy of the Soviet Government to establish state reserves, insofar as was possible, for those commodities in which the Soviet Union is a net deficit area. In general, this policy has been achieved by curtailing consumption expanding production, and obtaining imports from Free World and Satellite sources. On the basis of limited information, the reserves are believed to be used only in extreme emergencies and it is not believed that amounts of importance have been withdrawn. This general policy has been effect over the period under consideration and no changes of importance have been noted.

Tin is known to be stockpiled at two reserve depots: at Kirov and at Moscow. It is probable that other depots containing tin exist in the USSR, however, there is no specific evidence on hand to support this contention.

Mercury stocks are known to exist, but the amounts and specific locations of such reserves are unknown at this time.

Antimony stockpiles have not as yet been determined. The availability of Chinese antimony production has eliminated any imbalance between Soviet supply and demand and it must be assumed that the USSR has reserves available for emergency use.

V. Industry and Materials:

1. The Fourth Five Year Plan, 1946 to 1950, provided for substantial increases in output of non ferrous metals. The plan called for an increase by 1950 of 2.7 times the 1945 tin production, a figure which is not believed to have been met. The specific increases called for in the antimony and mercury industries are not known, although information concerning efforts to expand output indicate substantial planned increases.

2. The major problems encountered during this period include:

a. Limited commercially exploitable reserves. This factor may be overcome with extensive geological study and development work.

b. Lack of equipment and slow deliveries of machinery.

c. Inaccessibility and poor transportation to some of the ore deposits.

d. Extremely difficult climatic conditions for mining operations in some areas.

e. Shortage of technically competent personnel.

3. There have been no indications of changes in norms for the production of antimony, tin or mercury on an industry level. It should be noted that for mercury and antimony, the production norms are unknown at this time and that the norm established for tin is known in the form of a percentage figure of previous production only.

Insofar as the norms of specific installations within these industries are concerned, there have been changes, and these have been usually downward. These changes generally appear in annual norms, showing either a decrease or a lessing rate of increase over the preceeding year.

4. Production estimates for antimony, mercury and tin for the period 1945 to 1952 are as follows. These estimates are for primary output only. Those dealing with antimony and mercury are conjectural and subject to a wide range of error. The estimates for tin production are considered to be within a margin of 10 to 20 percent error.

Production of Tin, Antimony and Mercury in USSR

Year	Tin (metric tons)	Antimony (metric tons)	Mercury (flasks)
1945	3,800	n.a.	n.a.
1946	4,500	n.a.	n.a.
1947	5,300	n.a.	n.a.
1948	6,000	n.a.	n.a.
1949	7,000	n.a.	n.a.

Production of Tin, Antimony and Mercury in USSR
(Continued)

Year	Tin (metric tons)	Antimony (metric tons)	Mercury (flasks)
1950	8,000	3,000	25,000
1951	9,000	3,500	25 - 30,000
1952	10,000	4,000	30,000

5. The major sources of increased productivity are as follows:

a. Tin:

Economic Region XII:

Khingan Area - This tin field has been developed in the post-war period and may be one of the more important tin producing areas in the Soviet Union.

Kolyma Area - Developed by Dalstroy during World War II. The output is believed to be expanding.

Economic Region XI

Verkhoyansk Area - Developed by Dalstroy during World War II. The output is believed to be expanding.

Chita Oblast - Produced most of Soviet tin in the pre-war period. The output may be expanding slowly in the post-war period.

b. Mercury:

Economic Region XB

Khaidarkan - Developed during World War II. Output is believed to be expanding.

Economic Region III

Nikitovka - The only important producer of mercury in the pre-war period. This property was overrun by the Germans and largely destroyed. It is believed to have been restored in the post-war period.

c. Antimony:

Economic Region XB

Kadamdzai - Developed during the war, production is believed to be expanding.

Chauvai - Developed in post-war period.

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6. Little is known of the increase in the productivity of the labor force. There is evidence of attempts to introduce more mechanization and labor saving devices and it is probable that some success has been achieved.

The size of the labor force employed in the production of tin, mercury and antimony is not known. In the early post-war period, both prisoners of war and forced Soviet labor were used. It is believed that a relatively high proportion of workers currently engaged in mining are forced labor.

7. The major difficulties in meeting goals set have resulted from low grade ores, inaccessibility, lack of trained personnel, and a shortage of equipment and replacement parts.

8. It is believed that the goal for tin production will be extremely difficult to meet for the reasons given in Number 7 above, but is within the realm of possibility. The goals established for the production of antimony and mercury are unknown at this time.

9. The most important limiting factors in the tin industry are believed to be inadequate reserves and difficulty of access. Although the Soviets have claimed extensive tin reserves, the grade of the ore is believed to be low. Also, many of the occurrences are located in regions of extreme climatic conditions with very poor transportation facilities available.

Little is known of mercury ore reserves, although the deposits of the Fergana Valley are believed to be low grade and the Nikitovka deposit may be nearing exhaustion.

In general, the reserves of antimony ores, although adequate, are believed to be low grade.

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TRENDS IN SOVIET ECONOMIC POLICIES SINCE 1945 OFFICE-WIDE PROJECT 0.12

Non-Metallic Minerals

III State Reserves

The State reserves program in the USSR since 1945 has varied considerably throughout the various parts of the Union. The industrial output in the World War II devastated regions of European USSR during the 1946-50 period (fourth Five-Year Plan) were pointed toward reaching the pre-war level of production by 1949 and exceeding that level by 15 percent by the end of 1950. Thus for European USSR it does not seem probable that there were any large reserves or stocks of non-metallic mineral products or construction materials available during this period. The Ural Mountain Region Soviet Central Asia Western and Eastern Siberia during the World War II period surpassed greatly the pre-war production levels and continued to expand in order to provide material for the restoration of the war devastated parts of European USSR. Thus reserves developed in these areas were expended for the most part on European USSR.

The Soviet Union is a deficit area in the construction materials, building bricks, cement, sheet and window glass, gypsum and asbestos. Because of the nature of these products they are usually produced for immediate use only. Thus it is improbable that there would be reserve stocks of these materials even if available supplies were adequate. The drain on building and manufacturing industries for supplies for the Korean conflict has made a further drain on production and supply of construction materials and strategic non-metallic products. It is believed, therefore, that from 1945 to date there is little evidence to show that there are stocks or reserves of non-metallic minerals and construction materials in the USSR.

V Industry and Materials

There were definite changes in plans for the construction industry beginning in 1946. The 1946-50 Five-Year Plan called for the termination of the construction of gigantic plants and other extravagancies in the field of construction. In the cement industry, plans were made to construct small plants in each Oblast. These small plants were to take care of local demands. A few large plants were to be constructed to provide cement for large government projects. The plan for large plants was to provide 24 such plants by 1949.

The major problems encountered were the failure of the machinery and equipment industries to provide the cement plants on schedule. By the middle of 1948 only 16 of the 24 new plants were completed, and many of the plants in European USSR which were to have been rebuilt by the end of 1946 did not come into full-scale production until 1948. Another problem was that of competent manpower. Heavy industry for the most part has the highest priority for manpower and thus the technical level of the employees in the construction industry is low.

4. Production

	Cement 1,000 of Metric Tons	Construction Bricks Millions of Bricks	Sheet Glass Millions of Sq. Meters	Asbestos 1,000 of Metric Tons	Fluorspar 1,000 of Metric Tons	Gypsum 1,000 of Metric Tons
1945	1,800	1,600	23.5	29	50	252
1946	3,400	3,000	42.7	54	50	476
1947	4,800	4,400	50.8	75	75	652
1948	6,600	6,864	60.9	90	100	924
1949	8,800	8,000	75.0	95	125	1,232
1950	10,500	9,600	80.0	100	150	1,470
1951	12,400	12,300	83.0	110	150	1,736
1952	14,500	15,990	90.0	120	160	1,900

Another major problem in the cement and brick industries is the large quantity of poor quality material produced. As much as half of the total annual cement

output is of low grade and not satisfactory for structural use. Many of the bricks manufactured also are of poor quality. About 35 to 45 percent of the total annual output cannot be used.

5. The major source of annual increase in output

The large producing centers for construction materials by regions follow:

a. Cement

Economic Region III - Novorossisk

Economic Region VII - Moscow area, Podolsk, Bryansk

Economic Region VI - Volsk

Economic Region IX - Novosibirsk

Economic Region XI - Krasnoyarsk

Economic Region XII - Spassk Dalniy and Londoko

b. Construction Bricks

Economic Region Ia - Sluditsy

Economic Region II - Monastyrshchina and Svyatskiy

Economic Region VII - Bymhniy Volochek, Moscow, Kalinin and Staritsa

Economic Region IX - Tomsk and Stalinsk

Economic Region XI - Chita, Karymskoya and Sosnovka

Economic Region XII - Birobidshan, Komsomolsk and Voroshilov

c. Sheet Glass

Economic Region Ia - Leningrad and Kondopoga

Economic Region IIb - Gomel

Economic Region IIa - Riga

Economic Region V - Yerevan

Economic Region VII - Gus Khrustalny

Economic Region IX - Novosibirsk

Economic Region XII - Kiparisovo

d. Gypsum

Economic Region Ia - Leningrade and Petrosavodsk

Economic Region Ib - Isakogorka

Economic Region IIa - Minsk

Economic Region III - Mitovka

Economic Region V - Kirovabap and Tiflis

Economic Region VI - Kuibyshev

Economic Region VII - Stalinogorsk, Dzirshdnsk, Moscow and Danilovo

Economic Region VIII - Chusovoy, Ufa, Chelyabinsk and Chkalov

Economic Region Ia - Dshambul, Alma-Ata and Stalinabad

Economic Region XI - Krasnoyarsk, Balaganak and Sherlovaya Gora

Economic Region XII - Belogorye

e. Asbestos

Economic Region VIII - Asbest and Bajenova

f. Fluorspar

Economic Region Ib - Amderma

Economic Region Xa - Aurakhmat

Economic Region Xb - Takob

Economic Region XI - Kalanguy and Abagatuy

6. The increases in productivity may be obtained from the production estimates. Increases in labor forces in the construction industries have been attained in many cases from war prisoners. The construction industries have on the whole a low priority for technically trained manpower and thus there are often an adequate number of workers available but their productivity is low.

7. The specific difficulties in reaching the plan goals are: the lack of adequate numbers of technically trained personnel, which results in a high percentage of unsatisfactory finished products, and a shortage of cement plants, equipment and replacement parts for existing plants.

8. The quoted production totals for the Fifth Five-Year Plan are realistic but because of the low quality of 30 to 50 percent of the products produced the goals are believed to be unrealistic.

9. The limiting factors in the construction materials field are the shortages of equipment replacement parts and trained personnel. As long as the USSR continues to consider the construction industry a low priority field the growth of this industry and all industries which require roads, buildings, airports, plants and factories will be hampered.

IV.

Iron and Steel

III. A. Little definite information exists on mobilization reserve and state reserve programs as related to pig iron, ingot steel, or finished steel products. No evidence exists to lend support to the theory that stockpiling of the above products is practiced in the USSR. It is felt, however, that a very small percentage of finished special steels may be held in reserves. Normal accretions of iron and steel products at mills and warehouses, it should be noted, are inventories and not stockpiles.

V. A.

1. The end of the war found the steel producing regions of the Ukraine and those around Moscow and Leningrad in ruins. In the Urals and Siberia steel producing facilities were working in an all out effort to sustain and maintain the USSR with only one half of its usual iron and steel capacity.

The immediate task at hand was reconstruction of all the more easily repaired open hearth furnaces and rolling mills. Later came the repair of blast furnaces when the open hearths required hot metal to supplement depleted war scrap supplies. Modernization was attempted along with reconstruction and by 1949 the war damaged areas, rebuilt in the prewar pattern, regained their former status as important steel producing regions.

New planning and construction were proceeding at the same time as reconstruction. Because of lessons learned during the war when great steel producing regions were lost and other regions cut off from supplies, the Fourth Five Year Plan (1946-1950) envisaged a USSR with complete regional self-sufficiency. New construction was particularly evident in the Caucasus, Central Asia, and the Far East, regions

hitherto dependent on other areas of the USSR.

In addition to reconstruction, new construction, and modernization other methods were either instituted or intensified to increase production. Principle among these was the program to educate production people in methods of driving equipment harder and diminishing down-time thereby raising output without capital expenditure.

Announcement of aims to be achieved in the Fifth Five Year Plan (1951-1955) are essentially continuations of the aims of the previous plan and do not represent any significant departure from the 1960 goal of 50,000,000 tons of pig iron and 60,000,000 tons of steel.

2. The most important problem facing the Russian steel industry since 1948 is the one of raw materials. Intensive exploration for new deposits of iron ore, manganese, and alloying minerals are under way. Exhaustive efforts to obtain scrap from all possible sources have been highlighted by the newspapers many times. Preparation and improvement of raw materials has been dwelt on at length by Moscow planners. It is this last item that has received the most attention. Iron ores must increasingly be concentrated and sintered. With a wider range of steels produced, than ever before, many of high quality, scrap separation has become a significant factor. The demand for high quality refractories has long been the subject of agitation for improved refractory materials and methods. Construction of coal washing and preparation facilities are needed to reflect improved physical and chemical standards at coke plants. The ever present problem of high sulfur Donetz coal requires blending if optimum coke rates are to be obtained. Other raw materials such as limestone and water, both required in large quantities, do not at present

represent much of a problem.

Since 1937 efforts have been made to overcome the transportation problem of cross hauling material in the steel industry. By 1948 this situation still remained having been improved somewhat by further integration of raw materials, mills, and markets although the geographic location of coal and iron ore deposits precludes a basic elimination of existing conditions.

In 1948 the reconstruction of war damaged mills was proceeding rapidly and by 1949 was practically completed.

As the problems of reconstruction were eliminated, the trials of new construction took their place. In both cases, however, the principle bottleneck lay in construction of new metallurgical equipment, particularly rolling mill equipment. They encountered great difficulty in the building of blooming mills, continuous hot and cold mills, and other continuous finishing equipment.

With so much material and energy directed toward the efforts involved in reconstruction and new construction, the maintainence and the continuing mechanization of existing facilities suffered.

The problem of obtaining sufficient operating personnel of high quality seems to have been partially overcome by intensive educational training by the Ministry of Ferrous Metallurgy.

The last and ever present problem is the one of new technological advances in iron and steelmaking processes to overcome present inadequacies and increase production. Advances have been made since 1948 in the use of high top pressure in blast furnaces; of the desulphurization of hot metal outside of the blast

furnace; use of oxygen injection in the blast furnace, the open hearth furnace, and in convertors; successful operation of 370 to 400 metric ton open hearth furnaces; increased use of the duplex process; in electric furnace design and operation; and ever higher speeds on rolling mills.

3. The most important norm in the iron and steel industry in the USSR is the steel coefficient representing the efficiency of an open hearth furnace and its ability to produce steel per square meter of hearth area. The coefficient has risen from about 4.0 metric tons of steel per square meter of hearth area per 24 hours in 1947 to about 6.2 in 1952. This coefficient claimed to have been attained in 1952 compares favorably with the open-hearth coefficient of the U.S. Steel industry. The blast furnace coefficient has shown a corresponding improvement.

4. (See Table next page)

5. Prior to 1950 the big gains made each year in pig iron and steel production were accounted for primarily by reconstructed facilities. By 1951, however, rehabilitated facilities accounted for no increase while new construction and increased efficiency accounted for all the increase. The following tables show what the claimed increases resulted from.

Increased Steel Production from New Facilities and Increased Efficiency 1951-1952

Year	Total Inc.Prod.	Inc.Prod from Efficiency	Inc.Prod from New Facilities
1951	4,100,000	33.0%	67.0%
1952	3,100,000	30.0%	70.0%

Increased Pig Iron Production from New Facilities and Increased Efficiency 1951-1952

Year	Total Inc.Prod.	Inc.Prod from Efficiency	Inc.Prod from New Facilities
1951	2,700,000	46.4%	53.6%
1952	3,100,000	35.5%	64.5%

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Product (Thousands of Metric Tons)	1947	1948	1949	1950	1951	1952	1953	1954	1955	1960
Metallurgical Coke	15300	18000	20200	25380	29000	33000	37000	39500	42600	
Pig Iron	11500	14000	16700	19300	22000	25100	28000	31000	34000	50000
Steel	14600	18700	23400	27100	31200	34300	37500	40700	43900	60000
Finished Steel	10300	13200	16700	19500	22400	25100	27600	30100	32600	
Rails					2125					
Wheels and Tires					515					
Axles and Forgings					448					
Wire Rod					1342					
Pipe and Tube					1342					
Heavy Sections					1188					
Light Sections					7951					
Rail Accessories					806					
Strip					403					
Sheet					2581					
Plate					3026					
Steel Castings					673					
Iron Castings					3580					

It should be noted that the percentage increases claimed by increased efficiency for both pig iron and steel are lower in 1952 than they were in 1951. This is indicative that the limit of production to be gained through better efficiency of operations is being approached. This source of added output is, of course, limited if the original practices were reasonably efficient. Future increases in output will depend to a great extent on new construction.

6. No information available.

7. For an answer to this question see number two which points out specific difficulties.

8. The goals for the Fourth Five Year Plan (1946-1950) were overfulfilled. The aims, as shown previously, for the Fifth Five Year Plan (1951-1955) are essentially extensions of the rates of increase realized under the Fourth Five Year Plan. Therefore it is concluded that the goals for the Fifth Five Year Plan are realistic.

9. Although the iron ore and coal reserves of the USSR are adequate to support a much larger steel industry, the quality of these two raw materials will require a considerable amount of preparation and beneficiation. If the Soviets are not in position to make tremendous investments in coal preparation and iron ore beneficiation plants by 1955, this may be a limiting factor on the expansion of the iron and steel industry.

Iron Ore

V. A. 1. The rehabilitation of the Krivoi Rog Basin iron ore mining facilities, which accounted for over 50 percent of prewar production, was the foremost task confronting the industry immediately after World War II. It was announced that this job was basically completed at the end of 1947. Since then, there has been a gradual expansion of production facilities in this area as well as in the nearby Kerch district, on the Crimean peninsula. These two areas reportedly accounted for 52 percent of the Soviet Union's total iron ore production in 1950. There has been no evidences of sudden changes in the overall plans of the iron ore mining industry during the Fourth or Fifth Five-Year Plan periods. The industry has been meeting its production goals, however, not without some operational difficulties.

It was hoped that large-scale production would commence at the Kursk Magnetic Anomaly, in Central Russia, during the period 1946-50 but available evidence indicates that this was not attained. As of late 1949, 26 million cubic meters of overburden covering the orebody had to be removed before mining operations could begin.

2. One of the major problems encountered in the iron ore mining industry of the USSR has been the transportation of iron ore from mine to consumer. Inefficiency of scheduling, a shortage of ore-hauling cars and high costs of lengthy hauls are component parts of this problem.

Another problem has been the declining quality of the iron ore mined in the USSR. This is particularly true of the country's two leading iron ore mining centers, Krivoi Rog and Magnitogorsk, which have long been noted for their

extensive deposits of high-grade iron ore. The ore now being mined at Krivoi Rog is very powdery, resulting in a high loss during handling and transport and an increased ore-per-ton-of-pig iron consumption ratio. The rapid depletion of the rich ore reserves at Magnitogorsk has led the Soviet government to abandon the famous Magnitogorsk-Kuznetsk Combine Plan, whereby iron ore was shipped from Magnitogorsk some 1,200 miles eastward to the metallurgical center of Stalinsk in return for coal from the Kuznetsk Basin. During the Fourth and Fifth Five-Year Plans, Soviet geologists have been conducting intensive exploration and surveying operations in an effort to establish a local iron ore base for the metallurgical center of Stalinsk. Although some progress has been made, the latest information available indicates that Stalinsk still requires iron ore to be shipped in from Magnitogorsk.

3. There is evidence indicating that changes in production "norms" have been rather frequent within the Krivoi Rog Basin ore mining complex, particularly during the years 1949-1950. Reasons for these changes are manifold, however, the principal reasons seem to have been due to inefficient management, improper equipment maintenance practices, and improper planning which resulted in the development of production bottlenecks.

4. The following iron ore production figures are the best estimates available at the present time. The range of error is believed to be approximately ± 5 percent.

USSR Iron Ore Production 1945-1955
(in million metric tons)

1945	16.0	1951	46.6
1946	20.0	1952	54.3
1947	25.0	1953	61.1
1948	30.0	1954	68.0
1949	35.0	1955	75.0
1950	40.0		

5. The Krivoi Rog Basin has been the major source of increase in iron ore production since 1945. This area contributes to the country's total iron ore production in 1945 was negligible but in 1950 it is reported to have produced 46 percent of the Soviet Union's iron ore.

The Urals region, which accounted for about 33 percent of the total iron ore production in 1950, is the other principal source of increased production. Areas which accounted for lesser increased in production are the Tula-Lipetsk district in Central Russia, the Dashkesan deposit in the Transcaucasus, and the Gornaya Shoriya district, south of Stalinsk, in Western Siberia.

6. A lack of information relating to increases in productivity and labor forces prevents any offering of an answer to this question.

7. There have been no filures to meet national plan goals for the production of iron ore in the USSR since 1945. Regionally, the Krivoi Rog Basin has had the greatest difficulty in meeting the annual production goals. In addition to the aforementioned reasons listed in part "3," it has been stated that water problems have been hampering production in the underground mines. Also, shortages of replaceable parts such as drill bits has caused numerous slowdowns in production rates of the various mines of the Krivoi Rog complex.

8. Although no actual plan goal for the production of iron ore in the USSR during the Fifth Five-Year Plan has yet come to light, production estimates, based on requirements plus export commitments, for the years 1951-1955 indicate that such a rate of expansion is entirely possible providing everything runs smoothly. Factors which could upset such an expansion will be discussed in part "9."

9. The primary factor which will affect the rate of expansion of the iron ore mining industry in the USSR is the degree of success attained in the ore beneficiation program. The USSR does not have enough good direct-smelting iron ore to support such ambitious production plans for any extended period of time. Most of the iron ore emanating from deposits now in production requires various kinds of beneficiation. Many ore processing plants were constructed and put into operation during the Fourth Five-Year Plan period and several more are scheduled to be put into operation during the period 1951-1955. Certain deposits, however, contain complex ores for which the Russians thus far have failed to develop economical processing methods. The so-called Kursk Magnetic Anomaly in Central Russia, contains extensive reserves of such ores. For the country as a whole, it appears that technological research in the iron ore processing field is lagging behind development plans.

Manganese

In view of international tension and the vulnerability of the USSR's two most important manganese deposits, Nikopol in the Ukraine and Chiatura in the Caucasus, the Soviet Government might deem it advisable to create a strategic stockpile of high-grade manganese in areas beyond the Urals. There is no documentation available to confirm the actual existance of a national stockpile but it can be readily assumed by analyzing the various aspects of the manganese industry.

War damage to Nikopol and rapacious mining methods practiced by the Russians at Chiatura resulted in a large decrease of manganese ore production in the Soviet Union during the immediate post-war years. Although the loss was considerable, ore extraction was still of sufficient quantity to allow for a remaining surplus after domestic consumption and export requirements had been achieved. A table showing the estimated postwar manganese ore production and supply of the USSR is as follows:

Estimated Postwar Manganese Ore Production and Supply in the USSR
(Thousands of Metric Tons)

Year	Production 1/	Consumption 2/	Exports 3/	Surplus
1945	2,030	1,530	155	345
1946	2,210	1,280	259	671
1947	2,400	1,480	300**	620
1948	2,690	1,830	387**	480
1949	3,380	2,160	74**	1,146
1950	3,910	2,540	59**	1,311
1951	4,000	2,600*	N.A.**	1,400
1952	4,100	2,665*	N.A.**	1,435
		Estimated Stockpile		7,408

* Consumption estimated as 65% of production

** U.S. Imports Only

As indicated on the above table, the manganese industry was gradually restored to where the 1949 production surpassed the 1938 all-time high of 3,200,000 metric tons. Annual production from 1950 to 1952 indicates that 4,000,000 metric tons of ore may be the leveling off point for the industry.

At the same time production was reaching new levels, exports of manganese ore began to decline. The United States, formerly a large market for USSR manganese ore, imported 387,000 metric tons during 1948, partially for stockpiling purpose. A change of Soviet policy cut exports to the United States to 74,000 metric tons in 1949. During 1951 and 1952, United States imports were practically nil. Trade restrictions between the East and West limited Soviets exports of manganese to member countries of the Soviet bloc and the Scandinavian countries. Requirements of these countries are small in proportion to what the Soviets normally would make available for export. The high level of production at Chiatura from 1948-1950, may have been planned largely for stockpiling purposes, though normally export possibilities would be a primary consideration of these deposits.

Summation of production, consumption, and exports of manganese ore in the USSR since 1945 reveal that an estimated surplus of 7,408,000 metric tons remains for stockpiling purposes. This amount would be sufficient to supply the Soviet Union's manganese requirements for approximately 3 years.

During the latter part of 1952 and the first half of 1953, offers of Soviet manganese to the West became known. Terms of trade included both "exchange of goods" and "currency payments." The reappearahce of Soviet manganese in world markets could suggest that the USSR's quota for stockpiling of this important mineral has been reached.

The greatest difficulties encountered by the manganese industry from 1945 to the present time was repairing the war damage suffered by the industry. Demolition by the Germans and other results of the war prevented any important production from Nikopol until 1948. The Chiatura mines were damaged during the war, not by direct enemy action but because of the mining methods employed. Apparently normal mining practices were abandoned in view of the proximity of the mines to the combat areas and the urgent need to get as much ore out of the ground as possible. Consequently, predatory exploitation resulted in a slow recovery for several years following the war. By 1949, production for both deposits was above prewar figures.

Estimated Manganese Ore Extraction in the USSR
(Thousands of Metric Tons)

Year	Total Production	Percent		
		Chiatura	Nikopol	Others
1950	3,910	45.8	31.2	23.0
1949	3,380	45.5	28.5	26.0
1948	2,690	44.6	23.5	31.9
1947	2,400	43.0	22.0	35.0
1946	2,210	43.5	19.4	37.0
1945	2,030	40.9	19.7	39.4
1940	2,800	54.6	32.3	13.1

The intense effort to restore extraction of the manganese ore to prewar levels and above was successful, but in doing so, serious shortcomings developed within the manganese industry, especially at Chiatura. Sufficient attention was not given to the problems of concentration of manganese ore, and as a result, output of first-grade metallurgical ore increased very slowly. Second and third-grade ores predominated in the production at Chiatura Manganese Trust. The introduction of new machine technology into the field of manganese concentration was to receive utmost attention in an attempt to improve the quality of concentrated ore. 4/

Since 1940, the Soviet Union has emphasized the development and exploration of new sources of manganese in the eastern regions of the country. A 200-member geological expedition, under the direction of the Dzhezda Ore Directorate is constantly prospecting for new supplies of manganese in the Kazakh SSR. Other areas undergoing further exploratory work include the Urals, Siberia, and the Soviet Far East. 5/ Development of new sources of manganese outside of the Caucasus and Ukraine regions has a twofold objective; first, the metallurgical centers in the East will be able to obtain their manganese requirements from local sources instead of depending upon long hauls from Chiatura or Nikopol, and secondly, the vulnerable position of the Chiatura and Nikopol deposits cannot be discounted in case of new hostilities. Reserves of the eastern deposits are considerably smaller and usually of lower grade ores. In a number of cases, lack of transportation to the consuming centers has stymied development of some of the eastern deposits. Despite these obstacles, production of manganese in the eastern regions has reached a degree to where most of the manganese requirements of the eastern iron and steel centers can be fulfilled by local deposits. Continuous development of these new manganese reserves has in no way lessened the importance of Chiatura and Nikopol.

An actual good figure for the production of manganese in the USSR during the Fifth Five Year Plan is not available but can be concluded to be within the range of 4 and 4.5 million metric tons of ore. The present rate of production along with introduction of new technological improvements would indicate that an annual target within the above-mentioned range would not be unrealistic.

Continued growth of the manganese industry in the USSR will depend upon progressive expansion of the iron and steel industry and a new trade policy that would

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again make Russian manganese available to the free world. Upon completion of an emergency stockpile, it is unlikely that increased domestic consumption will equal the present rate of production, therefore, most of the surplus ore will have to be channeled into world markets or production will have to be maintained near consumption levels.

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Metallurgical Coke

V-A- During World War II, 70 percent of the facilities of the coke-producing industry were destroyed by the Germans. This loss was compensated for to some extent by an expansion of facilities in the Urals and western Siberia. During the postwar period, expansion of coke facilities has proceeded here at a greater rate than elsewhere in the USSR.

The Russians have experienced considerable difficulty in rehabilitating the metallurgical coke industry of the Southern regions. Progress in the rehabilitation of the area lagged behind plans throughout the Fourth Five-Year Plan. At the end of 1950 the Southern region was restored to only approximately 75 percent of the prewar output.

Due to the shortage of reserves of the best types of coking coal, 92 percent of the coal produced for coking requires beneficiation prior to coking. Construction of facilities for this operation has consistently lagged behind plans.

The large deposits of coal with qualities suitable for coking are few in number and are so situated that excessively long rail hauls are often necessary to supply certain plants.

The available estimates of annual production of metallurgical coke in the USSR are believed to have a possible range of error of about + 5 to - 10 percent. The yearly figures are as follows (in million metric tons):

1945	12.5	1950 (Plan)	30.0
1946	14.0	1951	29.0
1947	15.3	1952	33.?
1948	18.0	1953	37.0
1949	20.2	1954	39.5
1950	25.4	1955	42.6

Several new coal fields, some of which started operations during the period 1946-50 and all of which should be put into production sometime during the Fifth Five-Year Plan pending completion of new rail facilities, are and will be significant sources of annual increases in coal for coke production. They are the Vorkuta field in the Pechora Basin (North and Northwest Region), the Tkvarcheli and Tkvibuli fields (Transcaucasus Region), the Uzgen field in the Fergana Basin (Central Asia), and the Bureya, Suchan, and Sakhalin Island fields (Far East).

It is estimated that in 1950 the production of metallurgical coke in the USSR fell short of the planned goal by approximately 5 million tons. A summary of the reasons why production was deficient is given below:

1. Slower progress than anticipated in the reconstruction of facilities in the Southern region.
2. Poor quality of the coal, particularly from the Donetz Basin.
3. Inadequacy of coal preparation facilities.
4. Shortage of spare parts.
5. Inefficient and incomplete utilization of existing machinery and equipment.
6. Poor organization of manpower and low standard of efficiency among labor.
7. Lag in application of results of research work to industrial production.

Plan goals for coke production in the USSR during the Fifth Five-Year Plan are unavailable. It is believed, however, that the lag in production which was apparent throughout the Fourth Five-Year Plan will extend into and probably throughout the Fifth Five-Year Plan.

The limiting factors which will tend to slow future expansion of coke production facilities are essentially the same as those which have hampered production

plans in the past. Perhaps the most limiting factor will be technological research in the utilization of low-quality coals for the production of metallurgical coke. It is imperative that the Soviet iron and steel industry learn to utilize these coals since the known reserves of good coking coal are insufficient to support an expanding iron and steel industry for any extended period of time.

The extensive use of worn-out and obsolete equipment throughout the industry is another factor which could cause a slow-down in the rate of coke production.

Ferroalloy Metals

This category includes tungsten, molybdenum, vanadium, nickel, cobalt and chromium.

V-A-1. A chronological history of the activities in this industry since the war, as best can be derived from available information is given in the following. It is pointed out that there has been very little information on any of these metals since about 1940. Plan goals and production norms are almost entirely lacking.

Until the end of World War II the USSR imported significant quantities of all of the ferroalloy metals, inspite of large domestic reserves of most of them. This resulted largely from the fact that the Soviets lacked the technical know-how and capital equipment to convert the raw ores to usable products.

The armaments program, the advent of jet planes and guided missiles, the general advance of technology and the rapid expansion of the USSR's industrial base have all served to increase the demands for ferroalloys in the post-war period. This growth in demand has been accompanied by a steady increase in production, but more often than not it has not been possible to assign specific dates to or even identify sudden specific changes in activity in this industry.

With the cessation of Lend-Lease shipments in June 1945, the USSR was confronted with immediate or imminent shortages of nearly all of the ferroalloying metals. This was especially true of the more highly refined and thus more difficult to manufacture products such as, extra low-carbon ferrochrome and the higher grades of ferrotungsten and ferromolybdenum. In order to overcome these shortages the USSR initiated a program in the ferroalloy industry designed to expand the physical volume of production and increase the quality of products. This program was given a high priority by the Soviet Government in order that a high degree of selfsufficiency could be attained in the field.

In the areas occupied by the German armies during the war many of the mines and ore treatment facilities were badly damaged. Vigorous efforts were applied in the immediate post-war period to rehabilitate and expand these facilities. The molybdenum-tungsten combine at Tyrny Aus in the Caucasus and the Monchegorsk Nickel Combine in the Kola Peninsula are prime examples of enterprises that were rebuilt and expanded during this period. The acquisition of the Pechenga nickel mine and smelter from the Finn's in 1944 further augmented the USSR's nickel supplies.

The Communist victory in China in 1949 gave the USSR access to the worlds largest and most productive tungsten deposits. By 1950 virtually all of China's tungsten production was available to the USSR. This reduced their dependency on domestic sources of supply and alleviated the urgency of developing less economic deposits in the USSR. Moreover, the availability of large tungsten supplies has made possible some substituting of that metal for less abundant alloying elements, such as molybdenum, consequently effecting a further saving of scarce resources.

Until 1948, when chromite exports to the U.S. were cut off, a large portion of the USSR's chromite production was for export. Consequently, chromite production dropped appreciably in 1949 when exports to the Western World ceased.

The embargo placed on the shipment of strategic material, including the ferroalloying metals, by the COCOM countries in 1950 further reduced the availability of these metals to the Soviet Bloc from foreign sources. This forced an additional burden on the USSR's ferroalloy industry since there was now a demand from the Satellite countries to supply products which had formerly been imported from the

West. The embargo proved especially painful to the Soviet Bloc for products which had remained in short supply due to technological difficiences, inadequate resources, or underdeveloped plant capacity.

2. The ferroalloy industry of the USSR was beset with many problems at the end of World War II. Here again, it is not possible to assign specific dates to the appearance of or to the ultimate solution to most of these problems. The industry, from the geological exploration, development and mining level on through the ore treatment and metal refining stage suffered from a generally low level of technical proficiency and lack of capital equipment. Transportation facilities were in many cases inadequate. This problem was complicated by the far-flung geographic distribution of mineral deposits and ore and metal processing facilities. Skilled labor and skilled technicians were in short supply. Apparently there has been no shortage of unskilled labor. Prisoner-of-war and Soviet forced laborers have been extensively used in this industry, especially in mining.

By January 1948 many of these problems were solved and for others, at least a partial solution had been reached. For example, the chemical compositions of recently produced chrome alloys reveal that the USSR has apparently overcome its former difficulties in manufacturing extra-low-carbon ferrochrome. Soviet technology in this field now appears to be as far advanced as that of the United States.

Up until 1947 the Soviets were experiencing difficulties in extracting vanadium from complex ores and in manufacturing ferrovanadium. There is strong evidence available that these difficulties have since been largely overcome.

Such other problems as insdequate transportation facilities, low levels of mechanization and skilled labor shortages are gradually being solved through

the investment programs of the Five Year Plans and training programs.

3. There is no information available on changes in "norms" of production within the industry.

4. Production estimates for the ferroalloying metals are given in the following table:

Table I
(Metric Tons-Metal)*

Year	Chromite	Nickel	Vanadium	Molybdenum	Cobalt	Tungsten
1945	300,000	15,200	NA	1,450	NA	1,230
1946	300,000	16,200	NA	1,125	NA	1,180
1947	500,000	21,000	NA	2,275	700	1,180
1948	600,000	25,000	NA	2,250	800	1,800
1949	350,000	29,000	NA	2,800	850	2,060
1950	500,000	32,000	1,000	3,045	900	2,570
1951	600,000	35,400	1,425	3,300	950	2,750
1952	650,000	38,800	1,700	3,550	1,000	3,000
1953	670,000	42,200	1,950	3,825	1,060	3,400

*Chromite in terms of chromite

Plan goals for only two of these metals are known for this period. Molybdenum production was to increase 2.1 times in the period 1945 to 1950. This goal is believed to have been reached. Nickel production was to increase 53% over the 1950 level by 1955. This goal is believed attainable.

5. Intensified geological exploration, development of new mineral deposits, capital investment programs to further mechanize existing facilities and the building of new processing facilities will all lead to increases in ferroalloy production. Technological advances that increase metal recovery levels and new processes of concentrating and refining complex ores help to attain the same goals.

6. There is no specific information available concerning annual increases in productivity and labor force in the industry since 1945.

7. Plan goals except as noted in #5 above are unknown. The general difficulties encountered by the industry since 1945 are discussed in #2 above.

8. Specific goals of the Fifth Five Year Plan are unknown except for nickel. For this product the plan goal is believed to be realistic and attainable.

9. There are both technological and geological factors which will combine to limit the growth of the ferroalloy industry in the USSR. Ore reserves for some metals are limited. This is especially true of tungsten, molybdenum and cobalt. However, the USSR is a vast area, much of which is still relatively unexplored geologically. There are possibilities that as yet undiscovered reserves of these metals will prove sufficient for many years to come. Known reserves of nickel, chromite and vanadium are sufficient to support high production levels until at least 1970 and perhaps beyond that.

Other factors that will tend to limit the growth of the industry are limited supplies of capital equipment and skilled labor plus the inadequate transportation facilities. Technological difficulties in processing the complex ores of some of the metals will undoubtedly be a limiting factor for some years to come.

VI. Agriculture

In 1946 Stalin made the following statement: "The principal aims of the new Five-Year Plan (1946-1950) are to rehabilitate the ravaged areas of the country, to restore the prewar level in industry and agriculture, and to surpass this level in more or less substantial measure". Close observation and analysis of the Soviet's agricultural achievements during the Fourth Five-Year Plan indicate that the prewar level of production was not reached, much less exceeded, for most of the major crops.

1. Estimates of annual production of major crops since the war, and the divergencies between plan goals and achievements:

Fourth Five-Year Plan (1946-1950).

While the Fourth Five-Year Plan envisaged an expansion of the production of all crops, the greatest increases were planned for grains and such industrial crops as cotton, sugar beets, and oil seeds. During the five year period total farm production was expected to exceed that of 1940 by 27 percent. Gross farm production failed to reach planned goals; information is not available in the aggregate to assess the degree to which production fell short of the 1940 level. The attached table, however, gives in absolute figures the goals to be achieved for major crops by 1950 and CIA's estimates of production for each year of the plan period.

Grains. Goals for the individual grain crops were not announced in the plan; the goal given is for total grains, and that in terms of biological production. The biological crop is an estimate of the amount of grain growing in the field before harvest in contrast with the barn harvest which is the amount of grain available for utilization after harvesting has been completed. In the accompanying table, all production data have been adjusted to barn harvest from the Soviet's announced biological crop figures.

Whereas the Soviet's claimed that grain production in 1950 was 98 percent of the planned goal, estimates of CIA show that production in that year was only 87.5 percent of the goal. In 1947, a good year for cereal production, the harvested crop was nearly 10 percent below the goal for 1950.

Sugar (raw value). Largely because of annual increases in the acreage of sugarbeets, the production of sugar increased each year of the Fourth Five-Year Plan. From a low level of 700,000 metric tons, production reached 2,180,000 metric tons in 1950, or 90.8 percent of the goal of 2,400,000 tons for 1950.

Cotton (unginned). Like sugarbeets, the acreage of cotton was expanded during the Fourth Five-Year plan years. For the most part, the increases took place on un-irrigated lands. During the period the acreage of cotton on irrigated lands was increased over the low level to which it had declined during the war, but by 1950 it was about equal to the prewar acreage. While the expansion of production in un-irrigated areas tended to reduce the average yields per hectare, the net result was a gradual annual increase in production. By 1950, gross production had doubled that of 1946 and had exceeded the planned goal by 100,000 metric tons, or 3.2 percent.

Potatoes. An important food and feed in many regions of the Soviet Union, potatoeproduction was quite low in 1946 at 62,900,000 metric tons. The following year production rose to over 71,000,000 tons and during the next three years exceeded the goal of 76,000,000 tons/which was derived from the announced acreage goal. Using this method, the best year, 1950, exceeded the goal by only 3.8 percent. If the Soviets planned on an increase in yields during the plan period, then the estimated goal may be low and achievements in 1948, 1949, and 1950 were still below the actual goal.

While Soviet agriculture was not successful in attaining all of the goals

announced for the major crops, some progress was made in recovering from the low levels of production that resulted from the war. Some industrial crops had exceeded prewar production because of stronger emphasis and support given them by the government.

Fifth Five-Year Plan (1951-1955). Although ambitious, the Fourth Five-Year Plan was not unreasonable in its demands on agriculture's productive capacity. The Fifth Five-Year Plan, announced in 1952, is unrealistic and it appears at this time to be unattainable. The plan for 1946-50 relied heavily upon the return of crop acreages to prewar levels and to a lesser extent on increases in yields to achieve the announced goals. Realizing, as they must, that increases in acreages are becoming more difficult to attain, Soviet planners in the Fifth Five-Year Plan have exhibited few inhibitions in establishing high production goals based to a considerable extent on fantastically high yields. In October 1952, Saburov, chairman of the State Planning Committee, spoke as follows: "The greater part of the increase of output of the most important crops will take place because of the increase of harvest yields. Due to an increase of yields, approximately 90 percent more gross production of grain, some 50 percent more raw cotton, and over 60 percent of sugarbeet will be obtained."

Grain is the chief food crop in the USSR, but neigher the USSR nor the US have in the past been able to increase grain yields greatly. The same is true of most other crops produced in the USSR, therefore, changes in yields can be discounted as an important factor affecting the achievement of goals. After two crop years under the new plan no significant increases in yields have been observed and attainments have fallen short of the 1955 plan.

Grains. Grain production during the plan period (1951-55) is supposed to increase by 40 to 50 percent. Fulfillment of this goal by 1955 would entail an average annual

increase in biological grain production over 1950 of 8 to 10 percent. During the first two years of the Five-Year Plan, however, no such large increase in grain production has occurred. According to figures released by the Soviets, biological production in 1952 is only about 5 percent greater than in 1950 (the base year of the Fifth Five-Year Plan). Therefore, if the Soviets are to fulfill their 1955 grain production goal in the remaining three years of the plan, they must increase production at the unrealistic rate of at least 11 percent each year. At present, the 1955 grain production plan appears to be impossible of attainment.

Sugar (raw value). Raw sugar production by 1955 is planned to reach 5,600,000 metric tons. During the first two years of theplan (1951-55), production was only slightly above 2,000,000 tons. While some further increases in production are expected during the next three years, it is extremely unlikely that the goal, based on high yields and moderate increases in acreage, can be achieved.

Cotton (unginned). During the Fifth Five-Year Plan theacreage sown to cotton is expected to be increased by 800,000 hectares. By the end of the first two years the acreage was increased by 600,000 hectares so that an increase of only 200,000 hectares remains to be achieved in the next three years. Because much of the new acreage is on semi-arid land, average yields have declined and production in 1952 was lower than in 1951 and at 3,200,000 metric tons was far below the goal of 5,000,000 tons envisaged for 1955. Even though the addition of 200,000 hectares is achieved, total production cannot be raised to meet the goal for 1955 without a substantial increase in average yields. Based on past records, these yields cannot be increased sufficiently to achieve the planned goal.

Potatoes. The production goal for 1955 is planned to be 112,400,000 metric tons of potatoes. This goal is 42 percent higher than the production of 78,880,000

tons achieved in 1950 and in 1952, the Soviet Union's previous high years. The trend in potato production has been upward, but the 1955 goal appears to be too high to be achieved during the next three years.

2. Specific difficulties encountered in the fulfillment of plan goals since 1945:

Fourth Five-Year Plan, (1946-50).

As noted above the goals of the Fourth Five-Year Plan were high, but they were not utterly unreasonable in that they were not greatly above prewar levels of production. The goals were high in relation to the low levels to which production had fallen during and immediately following the war. The achievement of goals was largely a matter of restoring production to prewar levels, or, in some crops, to exceed prewar slightly.

Reconstruction. One of the major problems encountered by Soviet agriculture during the first five years following the war was that of reestablishing the cropping pattern that had been disrupted in the areas that had been occupied by the German army. In the unoccupied but irrigated areas, irrigation systems had been neglected and required restorative measures. Goals were particularly hard to achieve in the first and second prewar years because of shortages of machinery, fertilizer, seed and other production requisites. Some farm buildings had been destroyed but the restoration of buildings that had been neglected during the war was a greater problem. Machinery had likewise deteriorated or had been destroyed and confiscated. In many areas livestock numbers had been decimated and herds required re-stocking. Crop conditions were favorable in 1947 with grain production reaching 90.2 percent of the planned goal for 1950.

Machinery. In the initial period of reconstruction, the chief hinderance to increases in production was the inadequacy of machinery and equipment.

Agriculture received only a few machines in 1945, owing to the fact that some of the factories had been destroyed while others had not switched back to peace-time production. As a consequence, agricultural production was obliged to depend upon worn-out and obsolete machinery, a condition that only improved slowly by 1951.

Fifth Five-Year Plan (1951-55)

Fulfilling the Fifth Five-Year Plan is a far more difficult task than was the attempt to reach the Fourth Plan goals (which were not attained except for certain industrial crops). New and higher goals make the Fifth Plan goals seem unattainable. Many of the difficulties encountered in the years 1946-50 have continued into the present plan period. A lack of proper machinery and lack of timeliness and efficiency in its use constitutes one of the present major problems. Many reports are available which indicate that the Machine-Tractor Stations are so obsessed with reaching their goals (in terms of standard plowing units worked) that the quality of their work has suffered greatly.

Despite reports to the contrary, chemical fertilizers are little used on other than the industrial crops such as cotton, sugarbeets, and flax. The quantity of such fertilizers that is available for other crops is too small to influence materially their yields or over-all production.

3. Are the specific goals of the Fifth Five-Year Plan realistic?

In general, the production goals of the plan for agriculture ending in 1955 are unrealistic when they are measured by either recent or by prewar achievements.

Grain. Having fallen short of planned goals for grain production in 1951 and 1952, it will be necessary for the Soviet Union to increase production at the rate of at least 11.2 percent each of the remaining three years to achieve their goal. Neither US nor USSR experience has shown that such increases are possible in total grain production.

Sugarbeets. The goals for sugar production are based on sugarbeet yields of 190 centners per hectare. The average prewar yield in the USSR was only 154 centners per hectare, and in the postwar period (1947-51) only 136 centners per hectare.

Cotton. By expanding production into unirrigated areas the acreage goals for cotton are attainable, but production goals are unrealistic based upon performance during the first two years of the plan and the tendency for average yields to decline as new unirrigated lands are brought into production.

Potatoes. The production of potatoes would have to increase by 42 percent over 1952 production to reach the goal set up for 1955. Here again the increase is expected to derive from increased yields while acreage is expected to be increased only moderately.

4. What factors are most likely to limit plan fulfillment: machinery, manpower, fertilizer, or arable land?

Arable land, machinery, and fertilizer appear to be the factors that are most likely to limit plan fulfillment.

The Soviet Union with its emphasis on increasing production by raising yields is tacitly admitting that it is rapidly approaching the limits of its cultivated acreage. There remain no large areas of suitable land that can be put into economically profitable production. The drainage of swamps and the extension of irrigation systems can increase the acreage that can be profitably cultivated by only a few hundred thousand hectares. Cultivated land in 1952 is estimated at 154,765,000 hectares, or 2.9 percent higher than the 150,400,000 hectares under cultivation in 1940. It is apparent, therefore, that the prewar arable acreage has been restored to cultivation and even exceeded.

With production largely dependent upon higher yields, it is appropriate that the factors that might make them possible be examined. Machinery per se has little affect upon yields per unit of land. Its chief value is in the saving of labor that results from its use. If, however, an adequate amount of machinery is available it is possible to improve the timeliness and efficiency of the various crop production operations which can result in better crop development and at the same time reduce harvesting losses. Up to this time adequate machinery and competent operators have not been available in sufficient numbers to bring about increases in yields or gross production. It is unlikely that such a state of mechanization can be reached by the end of the plan period.

While the application of chemical fertilizers can undoubtedly increase yields, there is little evidence that the available supply is great enough to extend its use beyond the industrial crops. The increased use of fertilizer may result in the increased production of these crops, but the results will have little effect on total agricultural production.

Only major losses of manpower will affect plan fulfillment. For many years able-bodied men have been drafted for military and industrial service and agriculture has had to depend upon women, older men, and children for a large part of its labor force. As mechanization continues the labor force can be reduced still further; manpower does not appear to be a factor that will limit production during the present Five-Year Plan.

Better varieties and strains of seed can improve yields, but their development and adoption takes place slowly -- too slowly to affect major trends in production during a given five-year period.

5. Are agricultural demands for these resources (machinery, manpower, fertilizer, and arable land) apt to conflict with specific industrial or military demands?

Machinery. Agriculture machinery will always be in competition with industry and armaments for the materials from which it is made. Of the finished farm equipment, tractors and trucks are the chief items that can be requisitioned and used in industry or by the military establishment. During World War II, Russia's tractor and truck park was depleted considerably by military requisitioning. Except for certain special-purpose tractors that would be ill-adapted to non-farm use, agriculture could be adversely affected by such requisitioning in the future.

Manpower. Agriculture is in direct competition with the demands of industry and the military for rural manpower. Past experience has shown that the state gives industry and military a higher priority in the allocation of manpower than agriculture. By Western standards Soviet agriculture makes un-economic use of manpower. Greater mechanization of farm work and more efficient use of labor can enable agriculture to maintain or increase production even though the demands of industry and the military further deplete the amount of labor available to agriculture. The adoption of greater mechanization and more efficient methods are slow processes, therefore, sudden shifts in manpower could result in short-run dislocations that could adversely affect production.

Fertilizer. Agriculture's demands for fertilizer (particularly nitrogenous fertilizer) would conflict with the munitions industry. Nitrates are a basic material in the manufacture of both nitro-glycerine and such fertilizers as nitrate of soda. Expediency will govern the State's decisions relating to the production of fertilizer or the diversion of raw materials to the munitions industry.

Arable land. There is little or no competition between agriculture and industry or the military for arable land. While industry needs building sites and the military needs training areas and proving grounds, both can utilize unproductive

or waste land to satisfy their requirements. The amount of arable land used for these purposes would be negligible.

6. In the long run, will food production be a serious limiting factor on the growth of the Soviet economy? If so, when will this effect become apparent?

There is little possibility that the Soviet Union can expand significantly its cultivated acreage, increase materially the yields of most of its crops, or enlarge substantially its herds and flocks during the current five-year plan period. Total agricultural production has not yet returned to prewar levels. Rather than being a net gain, the achievement of the prewar level of production would have the effect of an absolute loss to the per capita supply of most agricultural products in view of population increases that are taking place.

In their attempts to keep gross agricultural production in line with the increased demands of an increasing population, a large military force, and for maintaining reserve stocks, theSoviets have recently been placing greater stress on increasing the yields per unit of land already under cultivation through the use of improved strains of seed, greater use of fertilizers and improved techniques. Under their present economic system, the Soviets can disregard uneconomic returns resulting from low yields, and can extend the cultivation of any crop onto sub-marginal land. But, even a large expansion of mechanization and a resort to dry farming on a greater scale than is now being practiced will not solve their problem in the long run. If the population trend continues to rise, the combined factors -- limits on arable land resources and limits on yield increases -- can be expected eventually to result in food shortages perhaps during the next generation that might force the Soviet Union to enter upon a long time program of importing essential food.

Major Crops: CIA Estimates of Production in the USSR for the Years 1946-1952 and Production Goals for the Five-Year Plans Ending in 1950 and 1955
(in million metric tons)

Crop	1946	1947	1948	1949	1950	Plan 1950	1951	1952	Plan 1955
Breadgrain	43.07	47.26	45.28	48.03	49.26	NA	58.06	61.29	NA
Coarsegrain	23.13	32.59	29.15	28.21	28.17	NA	28.12	29.91	NA
Rice (Paddy)	.22	.31	.39	.39	.37	NA	.37	.37	NA
Total Grain	66.42	80.16	74.82	76.63	77.80	88.90*	86.55	91.57	126.40*
Sugar (Raw Value)	.70	1.54	1.98	2.00	2.18	2.40	2.09	2.27	5.60
Cotton (Un-ginned)**	1.61	1.77	2.25	2.46	3.20	3.10	3.50	3.20	5.00***
Potatoes	62.90	71.54	78.35	76.16	78.88	76.00****	70.72	78.88	112.40

NA Not available.
* Soviet goals for biological crop production have been adjusted to barn, or garnered crop estimates.
** Source: ORR Project 51-51 (WP)
*** CIA Estimate
**** Derived from announced acreage goals.

VII. Construction.

A. Policies, their changes and implications.

1. General Statement.

The Policies set forth for the building industry are unique and are reflected by the nature of the industry. To conform with planned economy and overcome such hindering factors as the increasing cost of construction, transportation problems and nation wide and localized shortages of primary construction materials, the Soviets have had to take drastic policy controlling measures.

In a normal economy, changes in the building industry are gradual and may take several decades to become significant. During any economic crisis, however, the building industry is usually severely affected and a change in policy may be made in an extremely short period.

The importance of the building industry in a national economy is often overlooked. In the USSR and its Satellites, approximately 60% of all investments are carried out by the building industry. It is evident, therefore, that any policy change affecting the building industry in turn affects a major portion of the economy and vice versa.

2. Laws of the Fourth and Fifth Five Year Plans.

Both post war five year plans have contained specific policy controls for the building industry. The Fourth Five Year Plan established a program for construction -- assembly work amounting to 153 billion rubbles out of a total

planned investment of 250 billion rubles. In addition, it decreed that the productivity of construction labor in 1950 must exceed by 40% the prewar level and that during the plan period, the cost of construction must be lowered by 12% as compared to estimate prices of 1945.

The Fifth Five Year Plan provided for a more than doubled output of certain building materials and an increased output of related materials indicating a planned expansion of the building industry itself. The plan further stated that the cost of construction would be lowered during the five year period by not less than 20%. The time of construction was to be reduced in addition to improving the quality of construction work.

On the basis of the foregoing plans, it is apparent that widespread concern over the increasing cost of construction -- which has been rising continually throughout the era of Soviet planning -- is not being alleviated at a rapid pace. This is borne out through the repeated arguments published in the Soviet building journals which continue to stress the theme of reducing building costs, and also emphasize the need to reduce building time and to improve the quality of buildings.

These journals may be considered as official spokesmen in all probability of policy in this field and reflect the true picture of existing conditions.

The need to reduce building costs has become acute. Many factors

have contributed to this situation, principally, the costs of materials and labor. High material costs have resulted from the extreme pressure to meet production demands. Quality has been low in cement, bricks, tile and timber resulting in a high percentage of damaged and unusable products. Timber, a critical item, in 1951 had an average hauled distance of over 1,000 km. whereas in the early 1930's it was less than 400 km. There have been many indications that materials requirements have been over-estimated to insure delivery of sufficient materials to the individual buildiers to complete their projects.

Elaborate methods have been adapted by the Soviets to conserve their precious steel by controlling its fabrication into structural members, all requiring much labor. As recently as January 1953, the Soviet press and radio have admitted to serious shortcomings in the organization of labor in the building industry.

These factors, and others, have contributed to an increase in building costs in 1951 to 650% of the 1928 costs.

3. Decrees and Ordinances.

a. Situation in 1950.

Many of the difficulties in construction have hinged on the cost, shortages, missuse, wastage and transportation difficulties of certain building materials with particular emphasis on structural steel. The situation was becoming especially serious during the postwar arms race, and in August 1950, The Ministry of Construction of Heavy Industrial Enterprises issued an important order controlling

the use of steel in new heavy building. The order pointed out that insufficient use is being made of lattice girder construction that excessive thickness of sheet steel is permitted; that sheet steel was being used for flooring, work platforms, bridges, etc., where it could be replaced with other types of rolled steel or other materials. The order established certain rules to be followed in the use of steel in building design including the following: (1) in planning new construction of steel structures of buildings, steel sections must replace sheet and multipurpose steel and that structures should not be of a type that require an increase in the total consumption of metal; it would, therefore, be necessary that steel frameworks be designed as lattice girder structures and that sheet steel must be reduced to a minimum thickness by efficient planning and more precise methods of calculating structures; (2) reinforced concrete should be used in place of steel in hoppers, floors and work platforms whereever possible.

b. Situation in 1952.

That the situation has remained serious in the building industry is evidenced by the continued denunciations of the industry with its wasteful methods.

In January 1952, by the direction of the State Committee of the Council of Ministers of the USSR in Charge of Construction, "Specifications pertaining to the economic use of metals, cement, and lumber in construction" was published in Stroitel'naya promyshlennoot'. Compliance with these

specifications was made mandatory in the design and erection of buildings and structures. It was claimed that many building organizations consumed in a wasteful manner, materials such as steel, cement and lumber that were in the shortest supply, although local low-cost building materials could have been utilized in place of these critical materials in many places without any ill effects on the quality of the structure. An overexpenditure of materials was also caused by unnecessary superfluities in the design. Further, there were losses and spoilage of materials in transit as well as excessive waste at the building site.

The specifications were lengthy and comprehensive. Only a few of the outstanding points dealing with steel, cement and timber are mentioned here. They were particularly strict with reference to the use of steel and included the following:

(1). Metal construction is to be used in those cases only where no other material is satisfactory.

(2) Rivited framing, requiring a greater expenditure of steel than does welded framing, is permitted only in particular parts of the structure.

(3) Apartment and public buildings up to 14 stories (inclusive) high are to be built without a steel frame, with brick bearing walls and reinforced concrete or brick columns.

There followed, at considerable length, a detailed description

of the types of structures which could or could not employ steel columns, beams and trusses with the alternatives that were permitted.

Specifications that dealt with cement, ruled on its storage, transportation and consumption including the following:

(1) Cement shall be transported in containers or specially adapted trucks or railraod cars.

(2) The intermixing of different grades of cement is not permitted since it leads to lowered efficiency.

(3) To advoid spoilage, cement storage plants are to be located in dry places, and only in spaces especially designed for cement storage.

In addition, there were limits to the mixing procedure and mixing proportions.

Timber, being amongst the materials considered critically in short supply, especially in southern areas, was assailed with equal vigor. Use requirements include the following:

(1) Deciduous lumber, when available, must be used for certain structural members in place of the coniferous variety.

(2) Scaffolding, concrete forms, etc., should be used repeatedly rather than discarded after one use.

(3) Laminated members should be used as should saw mill waste so that better grade of lumber may be conserved.

The foregoing rules are not all that were presented nor were these the only instances where restrictive specifications were set forth governing the building industry. There are many other articles, hundreds in fact, in official journals stressing the need for conservation of building materials.

c. Current situation.

A Pravda editorial of January 13, 1953, called "Build Quickly, Solidly and Cheaply", admitted to grave shortcomings in the field of building and pointed out that new industrial enterprises and housing were frequently delayed. These two groups constitute well over 60% of all new building in the USSR and the obvious conclusion is that other groups are equally affected. The article further states that incorrect use of labor, waste of material, material shortages and high overheads all result in a high cost of building and contribute to the shortcomings of the industry.

4. New Materials and Local Developments.

a. New Materials.

Building materials are fabricated from an unlimited number of basic ingredients. The USSR, in attempting to relieve the shortages of the primary materials, cement, lumber and steel, is carrying on an extensive drive to develop new and inexpensive substitute products. A May 18, 1953 article in Pravda by P. Yudin, the USSR Minister of the Building Materials Industry, pointed out that the building materials industry is still not meeting the growing requirements

of the country. Mr. Yudin stated that, although, the Building Materials Industry is not responsible for the production of either structural steel or building timber, it is responsible for the distribution of these materials to the various building projects and fully understands the need for substitutes.

The Soviet press has frequently reported on newly developed building materials. Most of these materials are still in an experimental state and are not yet being distributed for building. From the description of many of them, general distribution for country-wide use will not occur.

b. Local Developments.

The use of local products for building is also being stressed. Extensive geological surveys are carried on in advance of construction in areas where large building projects are planned. Sand, gravel and limestone deposits suitable for use in construction are considered as essential pre-requisites of the area immediately adjacent to a large construction project.

5. Reparations.

The value of materials extorted from the Soviet Satellities under the guise of reparations and legitimate trade is incalculable. Full details are not available for estimating either values or quantities of materials being moved to the USSR.

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it has been firmly established that a large share of the production of cement and steel from the Eastern European countries is shipped farther east. As much as 60% of the products of certain East German cement plants are sent to the USSR for reparations. Invariably a part of such a shipment is called substandard and does not count towards reducing the burden of reparations, but, on the other hand, the Soviets retain the entire shipment.

It is also known that an extremely large portion of the cement produced in Manchuria is shipped into the USSR for use in Far Eastern Siberia.

From Finland, the USSR has recieved large quantities of prefabricated homes in the form of reparations.

Not only are the materials being taken but the means of producing them are of equal worth. The entire production effort of many plants in the European Satellities is being expended on the fabrication of cement kilns for the Soviet Union.

6. Mechanization in Construction.

For many years, the Soviets have recognized the value of mechanization in the building industry. Rising wages and increased demands for labor have created a requirement for replacement of labor by machines so that actual building could keep pace with its scheduled production. Since most projects are custom built, many aspects of building are difficult to mechanize. Several processes, however, are easily mechanized and the Soviet policy has been to stress these processes in its mechanization drive, namely:

(1) Excavation work.
(2) Pile driving.
(3) Materials handling.
    a. Transporting.
    b. Hoisting
    c. Loading and unloading.
(4) Concrete Mixing

Excavation work is very easily adapted to mechanization and with the "Great Construction Projects of Communism" requiring the excavating of over 5 billion cubic meters of earth, the Soviet policy in this matter is easily understood.

From the opinions presented in various building journals, it may be concluded that the principal obstacles preventing rapid mechanization are the quantities and qualities of equipment. As with new types of building materials, much publicity is given to the latest developments in the field of excavation machines but the equipment is slow in reaching the job sites. Complaints from all points of the USSR point out the vast loss of machine hours from disabled equipment. The blame for this is cast in many directions but usually ends with the so called "inefficient organization" of the building industry and the lack of spare parts.

Such novel machines as "The Walking Excavator" and the "Earth Mole" receive much praise in the press but actually have only limited appreciation. A continuing drive toward mechanization is needed since there is considerable room for improvement by the Soviet industry in this field.

7. Pre-fabrication and Modular Construction.

Several postwar developments which the Soviets have publicized widely are mentioned here because of their effect on the building industry.

a. Pre-fabrication.

The Soviets have claimed great advancement in the pre-fabrication of houses. Pre-fabricated houses have been imported from both Finland and the East Zone of Germany but little is known of the actual progress that the Soviets, themselves, have made.

Much has been said of the pre-fabrication of large wall-panels and floor sections for apartment and industrial buildings. This construction procedure is used only in an area that is expanding and will continue to expand since an entire plant is required to produce these sections. This does not appear to be a serious drawback as many Soviet areas are rapidly expanding. Nevertheless, this process is still in its infancy and has not been attempted other than in several large cities.

b. Modular Construction.

Factory production of large reinforced-concrete beams, blocks and columns seems to be advancing rapidly. This would be conducive to the development of standardized dimensions, or the development of modular type construction. In most of the press reports dealing with these items, the massive size and weight of the pieces are stressed, saying that the world has never before known

such great successes in the building industry. The development of large, factory-made, reinforced-concrete building blocks is an advancement but, as with other Soviet technical development, the extent of actual use is not known and is probably quite limited.

e. Stakanovite Movement.

The Stakanovite movement is mentioned here only because of its publicity rather than its importance. This movement is an attempt to stimulate higher labor productivity through the pleasure of competition and awards. An extremely fast machine operator, bricklayer or other type of laborer may be highly praised and receive extensive notoriety but no mention is made of the number of assistants on hand or the hours of preparation for the speed trial. Only a highly talented individual would be able to maintain a continued pace equal to the records set by the Stakanovites and only a very small percentage of the labor force takes part in this movement. The greatest benefit derived from the Stakanovite movement is its propaganda value.

8. Recent Indications.

a. Use of Steel in Building.

From a content analysis of recent issues (the early months of 1953) of Soviet building journals; it was found that a noticeably increasing percentage of the articles deal with the use of steel in building. This is directly opposed to the policy of suppressing the use of steel and increasing the development and the use

of substitute materials. No obvious conclusions of greater availability of steel can be drawn since no reports of actual increased use of structural steel are available. It is a strong indication toward a change in policy, however, and deserves considerable more scrutiny.

This current trend of apparently pushing the use of steel in construction may be directly correlated with the various articles complaining about the poor quality of construction work, and the poor quality of materials, and wastefulness in handling and use. It seems that the apparent reversal of policy in the conservation of steel does not indicate a/ greater availability of steel but does indicate a policy of intent to obtain satisfactory construction.

b. Pre-stressed Concrete.

Recent articles in the building journals also show that experiments are being made in use of pre-stressed concrete. This is a relatively new field in building that is barely out of the experimental stage in any country. There is little to indicate the extent of Soviet progress in pre-stressed concrete but in all probability, they are getting full benefit from experience recorded in journals of western nations.

In the past, it was many years before new developments in western countries received attention or application in the USSR. Now, however, there is little, if any, delay in the Soviets grasping the benefits of western scientific and technical progress.

B. Organization and Personality Changes

1. General

The organization of the Soviet Construction Industry during the postwar period seems to consist of a labyrinth of conflicting fields of endeavor, authority and responsibility. Apparently all government organizations were engaged in some form of construction activity. There appears to be a trend towards concentration of construction responsibility into a single organization. In general the changing organization pattern of the Construction Industry seems to be based on the economic requirements for certain fields of construction.

2. Construction Ministries

In January of 1946 the Ministry of Construction of Heavy Industrial Enterprises, the Ministry of Construction of Fuel Enterprises and the Ministry of Construction of Military and Naval Enterprises were formed.* In the middle of 1947 the Main Administration for the Construction of Machine Building Enterprises, and the Main Administration for Construction of Oil and Gas Enterprises were organized under the direct control of the Council of Ministers of the USSR. **

Although the chief responsibility of these Ministries and Main Administrations was construction activity of various types, they also produced building materials. *** The Ministry of Construction of Heavy Industrial Enterprises performed construction for the Ferrous and Non Ferrous Metallurgical Industry and the Chemical

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* Actually these organizations were organized as Peoples Commissariats rather than Ministries.

** The Main Administration for Construction of the Oil and Gas Enterprises was probably broken off from the Ministry of Construction of Fuel Enterprises and attached directly to the Council of Ministers.

*** Building Materials as used in this study, and as used by the Russians does not include ferrous metals, non-ferrous metals, or lumber.

Industry. The Ministry of Construction of Fuel Enterprises carried out construction for the Coal Industry. The other ministry and the Main Administrations carried out those functions which are indicated by their respective titles. These functions were general and there was probably a considerable amount of overlapping.

In addition to these Ministries and Main Administrations there were a number of other Main Administrations for construction which were attached to non-construction Ministries. Such Main Administrations for Construction existed in the Ministries of Aviation, Electric Power Stations, Munitions, Construction and Road Building Machinery, Light Industry, Textile Industry, Communications, Transportation, Timber Industry, Food Industry, Fish Industry, and Meat and Dairy Industry. In addition Main Administrations for construction possibly existed in other Ministries such as Agriculture. There also existed a number of individual construction trusts which were attached to non-construction Main Administrations. Then, to add to the confusion, trusts not even bearing the name "construction" in their titles were carrying out a fairly large proportion of the construction effort.

In December of 1948 the Ministry of Construction of Fuel Enterprises was abolished and its functions transferred to the Ministry of Coal Industry. At the same time the Main Administration for Construction of the Gas and Petroleum Industry, which had operated directly under the Council of Ministers, was abolished and its functions transferred to the Ministry of Petroleum Industry. If there had been a clear cut movement towards establishment of a single construction ministry at this time, the functions of these organizations should have been transferred to one of the two remaining construction ministries. The continuing emphasis on the completion of reconstruction

may have been the reason for this assignment of construction responsibility to the using ministries.

In March of 1949 the Main Administration for Construction of Machine Building Enterprises and the Ministry of Construction of Military and Naval Enterprises were combined into the Ministry of Construction of Machine Building Enterprises. Since the functions of the two parent organizations were somewhat similar, this combination may have been designed to simplify the organization of the construction industry, or it may have been indicative of a change in emphasis on construction of facilities for production of industrial capital goods rather than on facilities for production of military end items.

If this move was a step towards simplification a step backwards was taken three months later in June of 1949 with the establishment of the All-Union Ministry of City Construction. This Ministry, which supervised city planning and constructed facilities such as water lines and street car lines for other organizations doing urban construction, was short-living and was abolished in March 1951. In May 1950 part of its functions were assumed by the newly established State Committee of the Council of Ministers of the USSR for Construction Affairs.

By 1952 the principal agencies performing construction work were the Ministry of Construction of Heavy Industrial Enterprises, the Ministry of Construction of Machine Building Enterprises, and the State Committee of the Council of Ministers of the USSR for Construction Affairs. The main administrations performing construction for the various non-construction ministries may be assumed to have confined their activities to their parent ministries.

In the reorganization of 1953 the two construction ministries were merged into an All Union Ministry of Construction but the State Committee of the Council of Ministers of the USSR for Construction Affairs was left unchanged. Both of the parent organizations of the new Ministry of Construction were organized on the basis of territorial coverage by subordinate Main Administrations, as well as by other administrations and trusts for specialized work, such as excavation, steel erection and sanitary engineering. In addition, the Ministry of Construction of Heavy Industrial Enterprises had a number of trusts which were charged with the responsibility for construction of ferrous metallurgical plants. Since both of the old construction ministries were organized on a territorial assignment basis, it would seem that any really effective merger would also call for a merger of the territorial Main Administrations. Whether or not this merger of Main Administrations has taken place or whether it is even planned is not known.

The disposition of the Main Administrations of non-construction ministries after the reorganization of 1953 is not known. In the absence of any information to the contrary the following All-Union Ministries are assumed to have Main Administrations for Construction: Coal Industry, Petroleum Industry, Transport and Heavy Machine Building, Electric Power Stations and Electrical Industry, Railways, Communications, Merchant and River Fleet, and Defense Industry. The remaining All-Union Ministries also may have Main Administrations for Construction. * Certain of the Union-Republic Ministries are assumed to have Main Administrations either at the Union or at the Republic level. These are the Ministries of Agriculture and Agricul-

* It is felt that neither the Ministry of Metallurgical Industry nor the Ministry of the Chemical Industry have Main Administrations for Construction. These are the only All-Union Ministries which are definitely felt to be without Main Administrations for Construction.

tural Procurement, Light and Food Industry, and Timber and Paper Industry. The position of the Ministry of Building Materials is not known.

In spite of the profusion of Main Administrations and Trusts engaged in construction activity, a fairly large share of the total construction output is being carried out by the newly created Ministry of Construction. During 1947 the three construction ministries and the two independent main administrations* in existence at that time carried out approximately 36%, by value, of all construction-assembly work. The Fourth Five Year Plan called for these construction organizations to carry out 37% of all construction-assembly work. The functions of the new Ministry of Construction are the same as those of the above ministries less the functions of construction in the coal and oil and gas industries. It may be reasonably assumed that the new Ministry of Construction is accounting for approximately 30% of all construction-assembly work.

The Soviets customarily refer to two methods of performing construction-assembly work, the contractual method and the "economic" method. In 1940 72.2% of all construction-assembly work was performed by the contractual method. In 1944 this percentage was 74% of all construction-assembly work. Although the old construction ministries and the new Ministry of Construction are habitually referred to as the "contract construction organizations" it would appear that other organizations are in the contract construction business in the Soviet Union. It is probable that these organizations are the various Main Administrations and Trusts which are engaged primarily in construction activity, though they are subordinate to non-

* These are the Ministries for Construction of Heavy Industrial Enterprises, Fuel Enterprises, and Military and Naval Enterprises, and the Main Administrations for the Construction of Machine Building Enterprises and the Oil and Gas Industry.

construction organizations. It is assumed that the proportion of construction-assembly work currently being performed by the "economic" method is approximately 20% of the total. Construction-assembly work during the period of 1946 to 1950 was performed approximately as follows:

Independent Construction Organizations	37%
Construction Organizations subordinate to non-construction Ministries or Main Administrations	43%
Non-Construction Organizations	20%

From 1951 to the present, the picture is approximately as follows:

Ministry of Construction or its parent organizations	30%
Construction Organizations subordinate to non-construction Ministries or Main Administrations	50%
Non Construction Organizations	20%

Very little can be said about the part the Ministry of Internal Affairs * plays in construction. An undetermined portion of its construction functions was transferred in 1946 to the Ministries for Construction of Heavy Industrial Enterprises and for Construction of Military and Naval Enterprises when these ministries were established. Nothing is known as to whether or not the new Ministry of Construction established in 1953 has taken on any additional functions previously assigned to the Ministry of Internal Affairs.

The local construction organizations on the republic level appear to have been consolidated under single local authorities some time after the 1953 reorganization.

* Known also as the N.K.V.D. and M.V.D.

Positive information exists on the Tadzhik and Georgian S.S.R.s, where new Ministries of Housing and Civil Construction were organized. It is presumed that consolidations have either taken place or are planned in other Republics.

This move should straighten out some of the confusion in the housing construction component. However, since approximately 80% of all housing is built by the various ministries, Main Administrations, Trusts, etc., which are engaged in construction activity, a great deal of confusion still exists. This state of confusion is being constantly criticized but nothing has been done to clear up the situation.

The most likely reason for the confusion in the organization of the construction industry in the USSR is the constant, and sometimes acute, shortage of building materials, steel, timber and construction machinery. It is possible that each ministry or lessor organization formed a construction outfit to back up its claim to a share of building materials. If this contention is correct, the evolution of a single, all-powerful construction ministry might be delayed until there are enough supplies for the needs of all organizations.

3. Building Materials Industry

The Ministry of Building Materials was formed in 1936 on a Union-Republic basis. It has continued to operate on this basis ever since. Although it has never been merged with other ministries, or subdivided, it probably has undergone several internal changes. At present it is responsible for the production of all but an insignificant portion of the cement manufactured in the Soviet Union. Cement production is established at the Union level. Production of building materials such as brick, lime, alabaster, etc. are established generally at the Republic level. This

Ministry has no production of metals or timber, although it does produce some fabricated lumber products, such as doors, windows, etc. All of the items produced by this Ministry, with the single exception of cement, are apparently also produced in considerable quantity by construction organization. In addition, the vast bulk of non-processed materials, such as sand, gravel, stone, etc. are produced by the construction organizations themselves, rather than by the Ministry of Building materials.

At present there is a tendency to make the Ministry of Building Materials responsible for the production of an increasing number of prefabricated items, such as pre-fabricated houses, large reinforced concrete panels, standard doors and windows, etc. It seems that the ultimate desire is to reduce the construction organizations to mere assembly units. This, of course, would greatly increase the degree of centralized control in the construction industry, and lead to a much more simplified organizational pattern. Exactly how far the Soviets can go in this direction is uncertain. It would seem that the level of technology will eventually limit the development of factory-produced pre-fabricated construction, but the limits of technological advancement are indeed difficult to estimate.

The Ministry of Construction and Road Building Machinery, which was formed in 1946 and absorbed into the Ministry of Transport and Heavy Machine Building in 1953, is not discussed in this section.

4. Personalities

When Construction Ministries were established in 1946 Pavel Aleksandrovich Yudin was named as Minister of Construction of Heavy Industry Enterprises, and

Semen Za Kharovich Ginsberg as Minister of Construction for Military and Naval Construction. Neither the Minister of Construction of Fuel Administration nor the Chiefs of the two independent Main Administrations are known. The fate of the Chiefs of these organizations, when they were absorbed into other organizations, is not known.

In June of 1947 Nickolay Aleksandrovich Dygay was appointed Minister of Construction of Military and Naval Enterprises, relieving Ginsberg. Dygay was advanced from Deputy Minister, while Ginsberg was transferred to the position of Minister of Building Materials.* When the Ministry of Construction of Machine Building Enterprises was formed in 1949, Dygay became the new minister.

In May of 1950 a major shift of personnel occurred. Yudin replaced Ginsberg as Minister of Building Materials, David Yakovlevich Raizer was promoted from Deputy Minister of Construction of Heavy Industry Enterprises to Yudin's former position of Minister, while Ginsburg vanished without publicity.** In the reorganization of 1953 Dygay emerged as Minister of Construction with Raizer as his deputy, while Yudin continued on in his position as Minister of Building Materials.

When the Ministry of City Construction was formed in 1949 it was headed by a Konstantin MiKhaylovick Sokolov, who was formerly Minister of Construction and Road Building Machinery. In January of 1950 Sokolov was demoted to Deputy Minister in the Ministry of City Construction, being replaced by one G. M. Popov, who was apparently a Party man. In May of 1950 Sokolov took over direction of the newly

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* Ginsberg replaced Lazar Koganovich as Minister of Industrial Building Materials. Since Koganovich was a one-time minister of this Industry, it must have been considered a fairly important post. Koganovich had replaced Leonid Antonovich Sosnin who had continued on as a Deputy Minister. Sosnin is apparently still a Deputy Minister.

** Ginsburg had been active in the construction field since 1930. In 1930 he was a member of the Presidium of the Sovnarcom. When the first construction commissariat was formed in 1939, Ginsberg was appointed commissar.

formed State Committee of Council of Ministers of the USSR for Construction Affairs, and is, presumably, still directing this committee. As was pointed out above, the Ministry of City Construction was abolished in 1951.

Little can be made of this jumble of personalities. Generally, it only serves to compound the confusion of organizations. It would seem that in the case of the Ministry of Building Materials Ginsberg was replaced by Yudin because of the failure of the former to guarantee adequate supplies of building materials. This is inconsistent with the fact that in the year before he was replaced Ginsberg claimed that the output of building materials was 111% of plan. Another theory suggests that Yudin was selected because he was a construction man, and the building materials industry was planning a large investment program. However, Ginsberg had much more construction experience than did Yudin. In short, various economic and political factors would have to be carefully weighed before any meaningful hypotheses could be developed. This weighing would take more time than is currently available.

C. Trends in Investment

1. General

A study of the Soviet Union investment pattern shows that the annual investment carried out by the construction-assembly industry has averaged 63.7% of the annual gross investment. This is based on actual and planned investments during 1928-1951. The greatest deviation from the average for any given year has been 8.2% with the upper quartile being 65.4% and the lower quartile being 61.1%.

Although the total annual investments and the annual expenditure for construction-assembly have been steadily rising throughout the plan-era, the ratio between the two has remained relatively constant as shown above.

The trend in emphasis in construction is revealed by determining the share of construction-assembly investment allotted to the various fields of economic activity and making a comparison of their ratios over a period of time. The basic fields of construction effort are considered to be industrial, transportation and communication, agriculture, and construction n.e.c.

2. Investment Distribution

A study of construction investment shows that the field of industrial construction has increased greatly during the Soviet plan-era and that the others have decreased. With the exception of the war years, this change has been at a relatively uniform annual rate.

Within the field of industrial construction, several noticeable trend variations have occurred, particularly in the machine building industry, the coal

industry and the building materials industry. While the over-all field of industrial construction increased from approximately 50 percent of the total construction effort in the prewar period to approximately 62% in the postwar period, an increase of 25%, construction in the aforementioned individual industries increased by approximately 50 percent.

In other fields, there were particularly sharp rises in construction effort in the immediate postwar reconstruction period. This was particularly noticeable in the coal industry, electric power, railroads and housing.

3. Conclusion

With the continued stress on economic growth and the development and expansion of new and previously undeveloped areas, the Soviet economy is still far from maturity. For this reason, the investment for construction should continue to rise, maintaining its position as a high percentage of over-all investment.

Building materials, which have always been in short supply and have held back expected progress in building, will probably continue to receive emphasis and expansion.

With new areas being opened up, the construction in raw material exploitation industries and basic industries, coal, petroleum, ferrous metallurgy, etc., should receive continuing, or possibly even gr ater, emphasis.

The indicated emphasis on expansion of the machine building industry may be attributed to two basic reasons. First, the construction of additional industrial plant space requires tools and machinery for production. Second, the

machine building industry is also considered as one of the principal covering industries for defense production.

D. Major Construction Projects

The publicized major construction projects of Communism can be divided into three groups: the Volga Basin - Don River Program; the South Ukranian Program; and the Turkmen Canal Program. These projects are large projects which require large inputs of both materials and labor over a lengthy period of time; however, they represent only a small percentage of the total construction output over the period of time that they are under construction. These construction programs, when considered together, amount to less than 10 percent* of the yearly output in any year.

The rate of expansion of the Soviet construction industry has been estimated at about a 10 - 15 percent increase in output per year. This increase in output in the year 1950 alone would be sufficient to cover the "great construction projects of communism".

It is extremely difficult to classify these programs according to type of output. All three of these programs are designed as simultaneous investments in the fields of transportation, irrigation, and electric power.** The electric power industry will probably gain most from the programs, but this is by no means certain.

*Estimates of the share of the projects in total construction output average about 6 percent, based on 1950 output.

**Propaganda could possibly be classed as a fourth field of investment since these projects are featured publicity items for raising workers' morale and national pride.

These programs appear to be major portions of the Soviet scheme of regional development, which will probably require considerably more construction than the programs which have been already announced. There is no indication, however, that this future construction output pattern will differ greatly from past construction output patterns.

The project scheduling is shown below. All of them started on schedule but the progress made since the starting date, and the chances of completing them on time are not known. The Volga-Don canal was opened approximately on schedule; but it is altogether possible that while the Tsimlyanskaya Dam itself was completed on time, all of the required generating equipment has not been installed.

Projects	Year Begun	Planned Completion Date
Volga-Don Program		
Kuibyshev Dam	1950	1955
Stalingrad Dam	1951	1956
Tsimlyanskaya Dam	1948	1951
Volga-Don Canal *	1941?	1951
Turkmen Canal	1951	1957
South Ukrainian Program		
Kakhovka	1951	1956-57

*Work was reported to have begun prior to WW II, but no announcement was made until 1948.

The status of completion of construction is not known at present, but, from the amount of publicity being given the various projects, it may be assumed that progress is probably close to schedule.

Since these projects are heavily publicized to exploit their propaganda value, difficulties in meeting planned schedules are probably kept to a minimum with every effort being made to prevent delays or complaints of any type. Deliveries of special materials and equipment for the projects receive special attention in the news with frequent comments that due dates are not only being met, but frequently anticipated.